

ماجستيد تناسليه (4)

ANATOMY OF MALE

(Genital system)

د/هانی ابوالوفا

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— just print —

01025329200- 0502200362

Male Genital System anatomy:

①

① Int. Genital System → See infestibility

② Ext. Genital System

Anatomy of Penis

③ Coverings: ^{epidermis} ^{dermis} ^{subcutis}

- Skin
- Dartos Fascia
- Buck's Fascia
- Tunica Albuginea
- Areolar Layer of Smith

④ Structure: e.g. Corporae ^{Cavernosa} ^{Spongiosum}

⑤ Ligaments & Muscles

⑥ Blood supply, venous & Lymphatic drainage Nerve Supply.

A. Coverings

① Skin

loosely attached to underlying Fascia.

Contain ^{Sebaceous} ^{Sweat} glands.

don't contain ^{S.C.T} ^{Hair} (partially free)

show 2 folds ^{Prepuce} ^{Frenulum}

② Dartos (Collis)

ACU

Def. → Superficial Fascia

part of Penis
loosely attached to underlying Buck's

Extension: To be connected to Fascia of scrotum.

derived from Scarpa's Fascia of Ant. Abd. wall.

③ Buck's Fascia

Def. → deep Fascia

Thick & Firm
attached to T. Albuginea.

Ext. to base of penis

4. Tunica Albuginea:

Strong Tough Fibrous Layer That encloses each corpus.

Composed \rightarrow Collagen
(alternating inner Circular & outer Longitudinal layer).

It $\begin{cases} \text{Fuse: at middle line} \\ \text{Separate:} \end{cases}$ \rightarrow Septum
 \rightarrow proximally to Cover
1 Course

at 1/3

Thinning = lack of outer longitudinal layer - occurs at
• 6 o'clock: to prevent C.S
allow ejaculation compression.
• 3, 9 o'clock \rightarrow most areas
of Fracture.

But it Allows Free passage of Blood Bet. the 2 units (so they form one vascular space).

also may be injured at these sites during penile prosthesis.

5. Arcular layer of Smith: (space)

Thin layer of Arcular C-T That Separates The Tunica Albuginea from underlying Cavernous Tissue.



deep layer

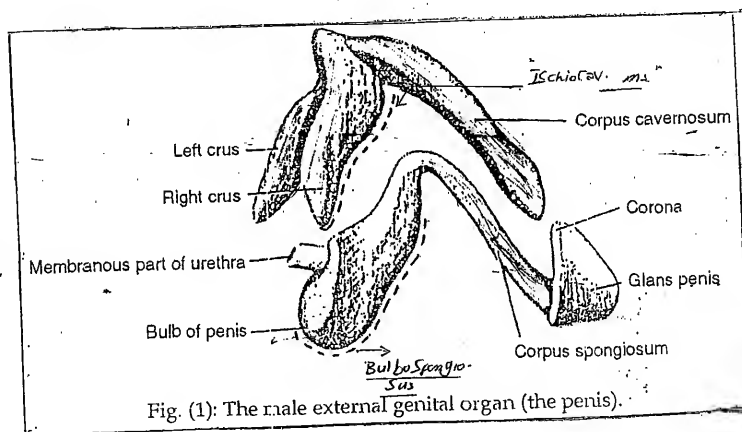
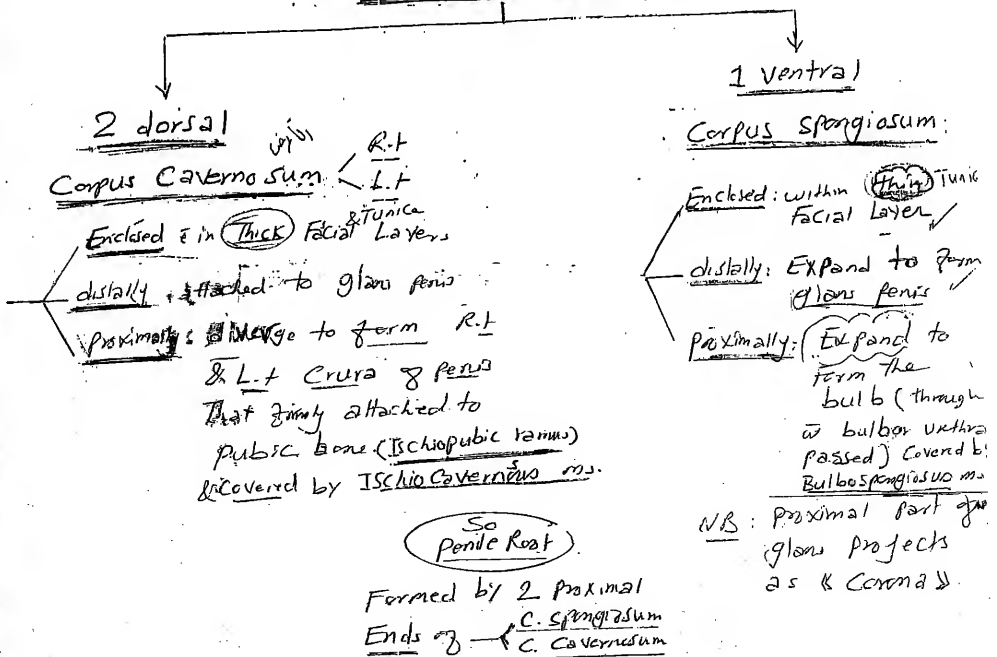
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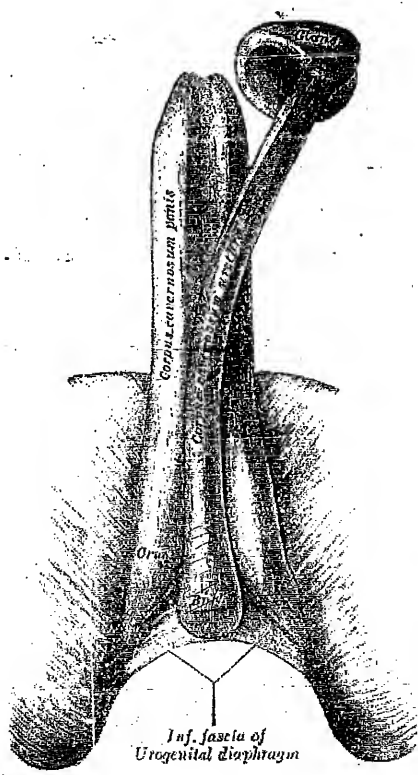
Structure of The penis:

5

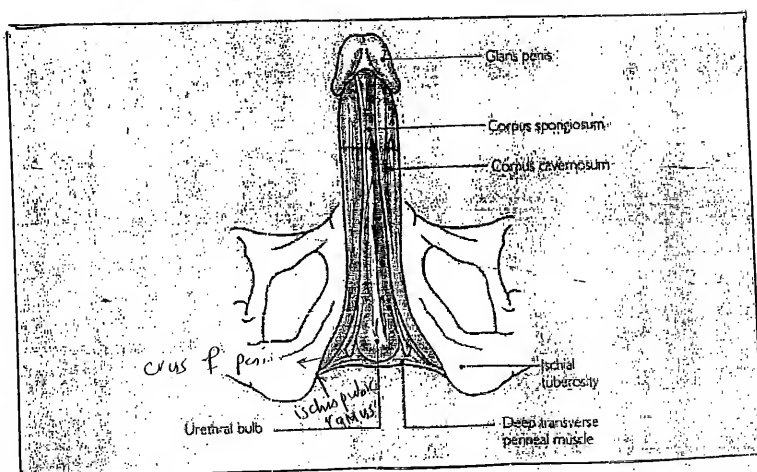
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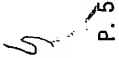
③ Parallel Longitudinal Cylinders





canal
- structure





4



Abstract

Cavernous Tissue

Sponge like (airy, ~~dry~~) Tissue formed of: ^{spaces} walls

1. Cavernous Space (Sinusoids): That's lined with Endothelium.
2. Walls (Trabeculae) Composed of:
 - (i) Endothelium
 - (ii) smooth ms. (5%)
 - (iii) frame network of Collagen & Elastic.
 - (iv) BVS.

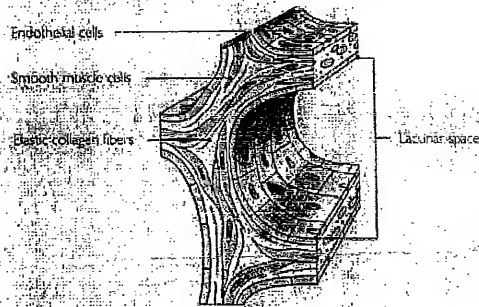


Figure 23 Smooth muscle architecture and vascular endothelium of the walls of the lacunar spaces within the corpora. Relaxation of these smooth muscle cells is an important component of the erectile mechanism

NB: C-Spongiosum is a Cavernous Tissue but differs from C. Cavernosa in:

1. Thin Tunica & Fascia.
2. Less smooth ms.
3. Smaller Sinusoids
4. Lower pressure < C.C.

Clinically Important Points

(7) p. 7

1. Penile Erection depends on:

disused A. Relaxation of: smooth muscles of cavernous arteries & spaces \rightarrow Filling of spaces by Blood \rightarrow \uparrow penile size.

disused B. Compression of: subtunical veins & emissary veins bet. Tunica & the cavernous tissue \rightarrow \uparrow penile rigidity.

2 3 Factors $\left\{ \begin{array}{l} \text{Thin Fascia} \\ \text{Thin Tunica} \\ \text{Lower pressure} \end{array} \right\}$ of C. Spongiosum as compared to C. Cavernosum.

\rightarrow prevention of pressure on urethra during Erection \rightarrow remains patent for passage of - Semen.

3 Rigidity of penis depend mainly on 2 Corpora Cavernosa rather than C. Spongiosum.

penile
to
part of
filling
penis
sub. vein

1/4

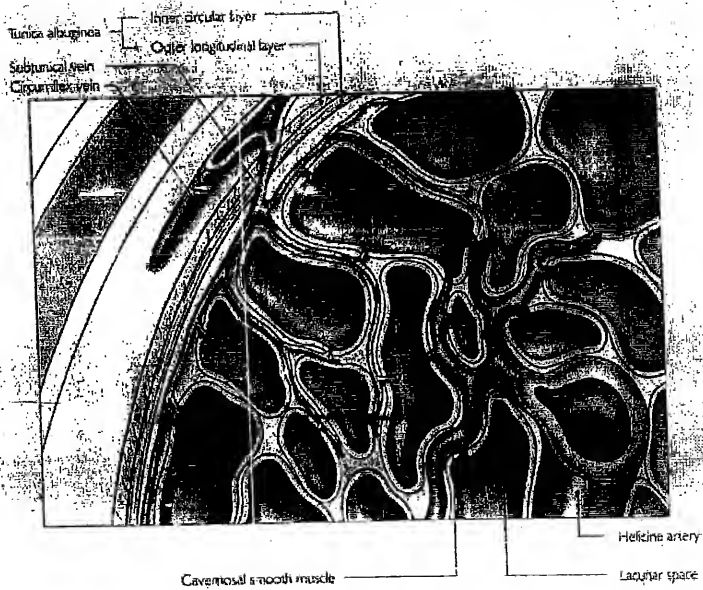
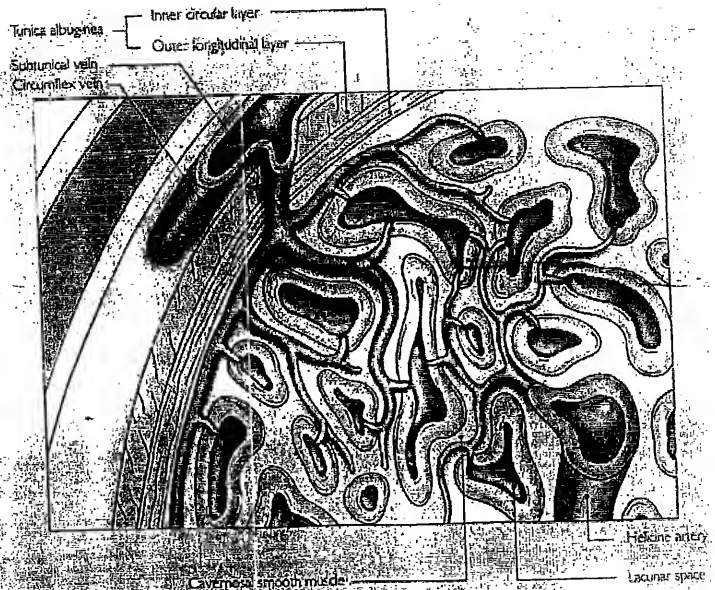


Figure 24 Hemodynamics of flaccidity. (a) Tonic contraction of the walls of the helicine arteries and trabeculae allows only relatively small amounts of blood into the lacunar spaces. Whatever blood is entering is drained



Contractile → ↓ Blood → Flaccid

Ligaments of Penis.

ant abd wall →
dartos fascia
→ scrotum.
→ Fundiform
Ligament

Suspensory Ligament

• Arise from: Facia & Ant.
Abd. wall → Pass. superficially
& inserted into sides of
Dartos Facia & Fuse again
inferior to penis as apart
of the scrotal septum.

• Arises from → SP →
passed deeply & inserted
into deep Facia of
Penis.

SP → Buckle fascia
→ base of penis

Muscles of the penis

(3)

Ischio Cavernosus

Covers the Crura of
Corpus Cavernosum

if Contract
erection
→ rigid Erect (r.b.p.s.s.p)
→ stop of blood inside
puddendal a.)

Bulbospongiosus

Covers the bulb
of C. Spongiosum

if Contract
ejaculation
Help Expulsion
of Semen.

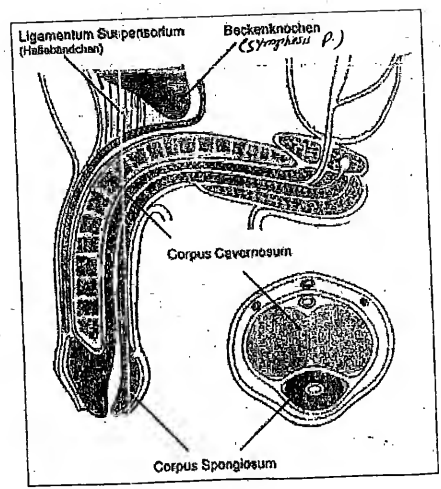
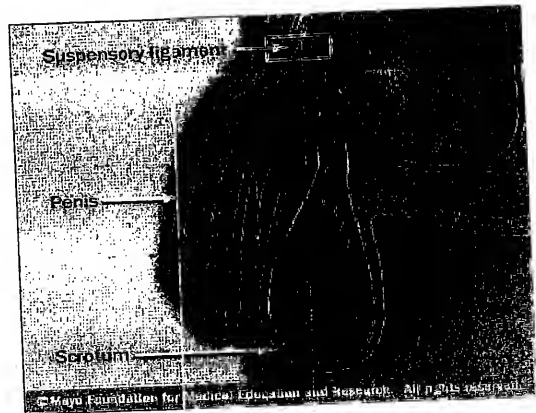
Ext. Urethral Sphincter

arise from
inf. Pubic
ramus →
encircle the
meatb.
Urethra

(Smooth
Sphincter)

(2 radial)
(1 Elastic)

So → Ischio Cav. m. → Erect
→ Bulbospongiosus m. → Ejaculat



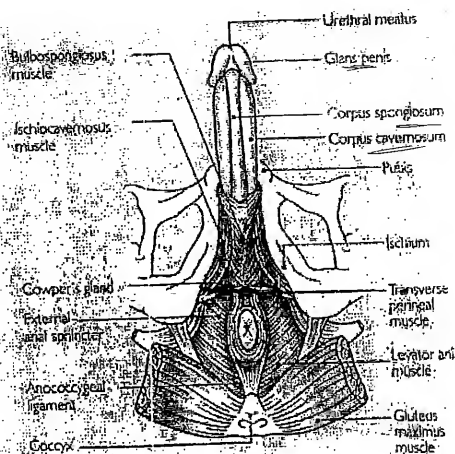
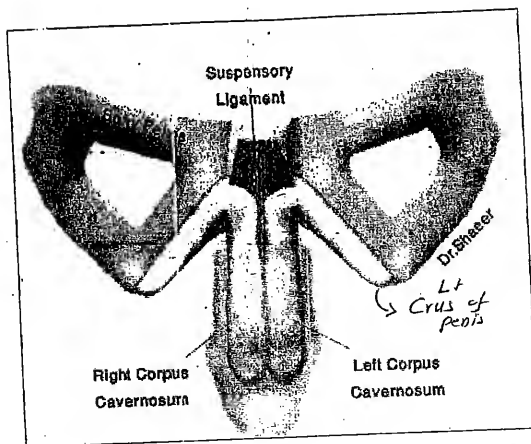
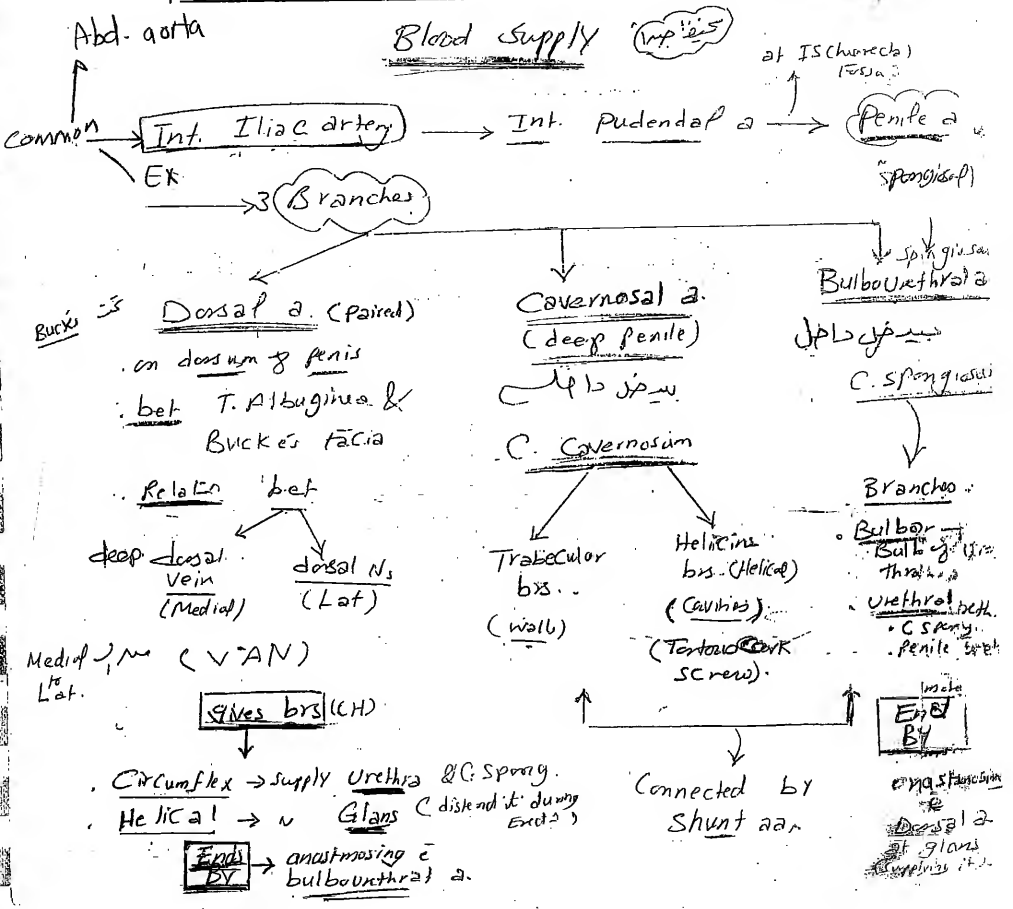
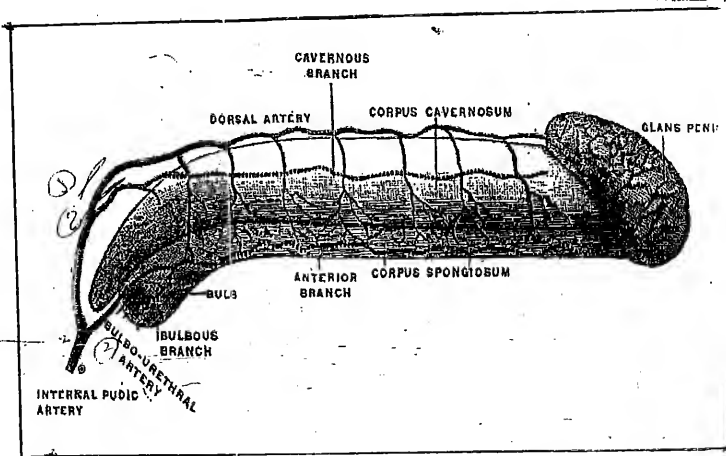


Figure 4 Muscles of the pelvic floor surround and support the erectile bodies and corpus spongiosum. In terms of sexual function, the most important muscles are the bulbospongiosus and the ischiocavernosus. These support the erect penis and also contract rhythmically at the time of orgasm to facilitate ejaculation



NB Shunt a.a. Arteries that connect the Cavernosal & spongiosal a.a.

Penile skin → supplied by Ext. Pudendal artery (br. from Femoral a.).

Clinically important point

Arterial supply & penile erection (Heliciform Shunt a.a.):
The tortuous course & special arrangement of heliciform a.a. are essential factors in ↑↑ Blood flow to cavernous spaces during erection... This is helped by 1 rich anastomosis bet. a.a of penis sp. 1 Shunt a.a. (that connect 1 deep penile a.a. in! Corpora Cavernosa & 1 a.a. in! Corpus Spongiosum.)

- Superficial draining Veins
- Deep draining
- Subtunical

Venous drainage

3 Systems

Emisary veins at Prostate join to form Cavernosal Vein that pass bet Cui & bulb → Int. Pud.

Superficial system
→ (Above Buckle's)

Superf. dorsal vein (Paired)

drain < Skin
facta.

drainage: Saphenous → Femoral V.

Intermediate System
→ (bet. Buckle's & Tunica)
(deep dorsal Vein & Circumflex)

on dorsal penis.

drain < glans.
C. spong.
distal C. Cav.

Terminate at Santorini (Periprostatic) Plexus

Int. pudendal V

Int. iliac

Deep system
(subtunical)
Cruial & cavernosal veins

Most C. Cav
Some C. Sp

end at

Int. iliac veins

Subtunical veins form network that drain Cav. Tissue. They unite to form cavernosal veins that penetrate

NB : Subtunical (Emisary) Veins

Network of Venules under Tunica connect venous system bet. C. Cav. & C. Spong.

So MUSE is important

→ impotence! ← contraction ← erection

Int. pudendal V → Int. iliac

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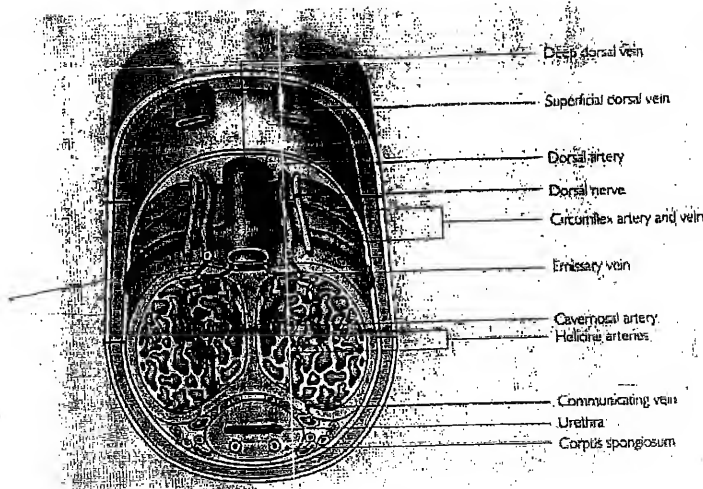


Figure 9 Cross-section of the penis showing the locations of the paired dorsal arteries and cavernosal arteries.
Note the helicine arteries, which supply arterial blood to the lacunar spaces

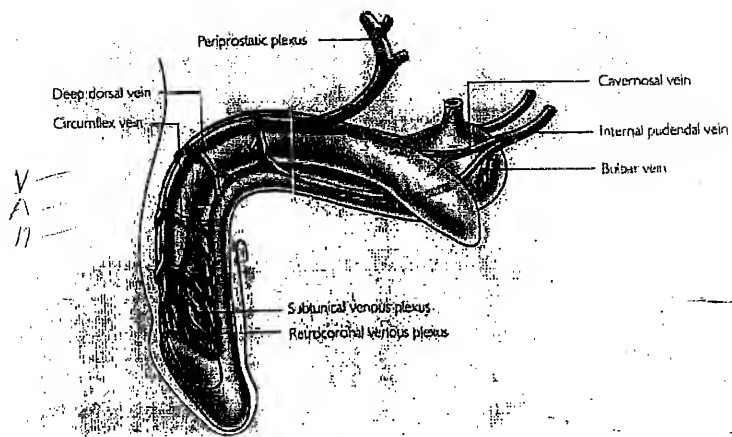
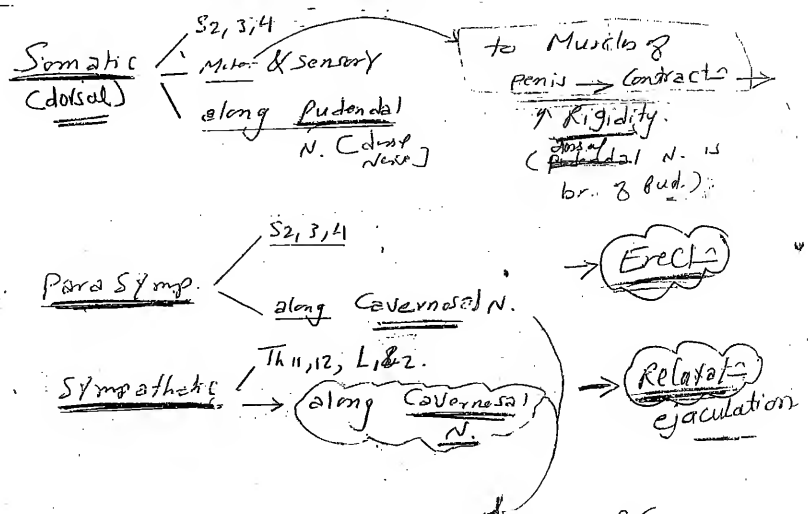


Figure 11 Venous drainage from the corpora cavernosa takes place mainly through the deep dorsal vein, which lies dorsally in the groove between the corpora and passes beneath the pubic arch to join the dorsal venous complex at the urethroprostatic junction. The less surgically accessible bulbar and cavernosal veins join to form the internal pudendal vein

Clinically important points:

- Compression of subtunical veins bet T. Albuginea & Enlarged Sinoids & the Tough
- Important Veno-occlusive Mechanisms for process of Erect.

Nerve Supply



Th11,12.
L1,L2.

• Lymphatic drainage:

to Superficial & deep inguinal L.N → Int. & ext. Iliac L.N

related to prostate & Uthra at 3 & 9 o'clock

↳ Liability to injury during prostate surgery

→ ED

not to be confused with subcutaneous

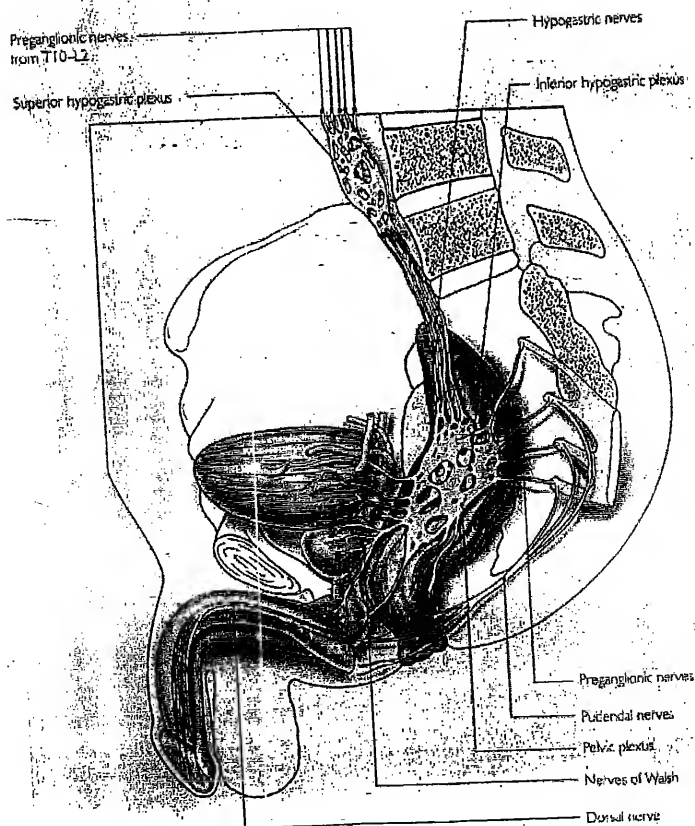


Figure 15 The hypogastric nerves are vulnerable during retroperitoneal lymph node dissection. Both sympathetic and parasympathetic nerves merge in the pelvic plexus and pass posterolateral to the prostate gland in the so-called neurovascular bundles of Walsh, where they may be damaged during radical prostatectomy and cystoprostatectomy.

lymphatic

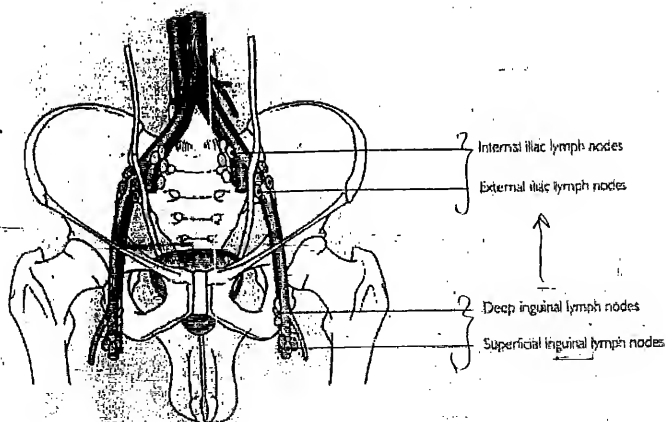


Figure 12 Lymphatic drainage of the penis is accomplished by the superficial and deep inguinal nodes which, in turn, drain to the iliac and para-aortic lymph nodes

Sup - di - mal
to
int. iliac

N. Saw
S. 13.0
M. 1.5
P. 1.0
Saw
P. 1.0
S. 1.0
M. 1.0
P. 1.0
S. 1.0
M. 1.0
P. 1.0

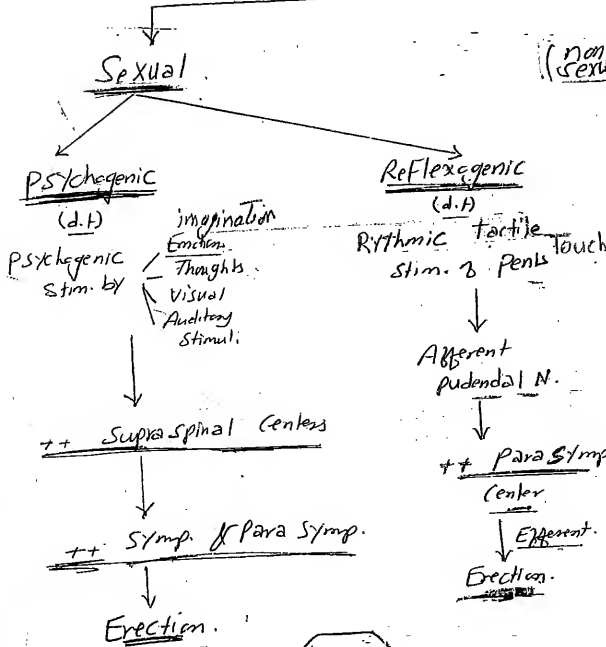
Physiology of Erection

(Sawal) Ull

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- ① Types
- ② Components
- ③ Control (Mechanism)

Types of Erection



during Sexual Intercourse Both occur.

• d.t. unknown much. but may be d.t. ↓ ↓ decrease
Supraspinal -- inhibition
spinal. Functions

③ Misleadings Related
To term:
penile tumescence (1)
penile rigidity
penile erection

② NPT = Nocturnal penile Tumescence
So Tumescence Not "Rigidity"

③ Relation to Arousal
up & Full bladder

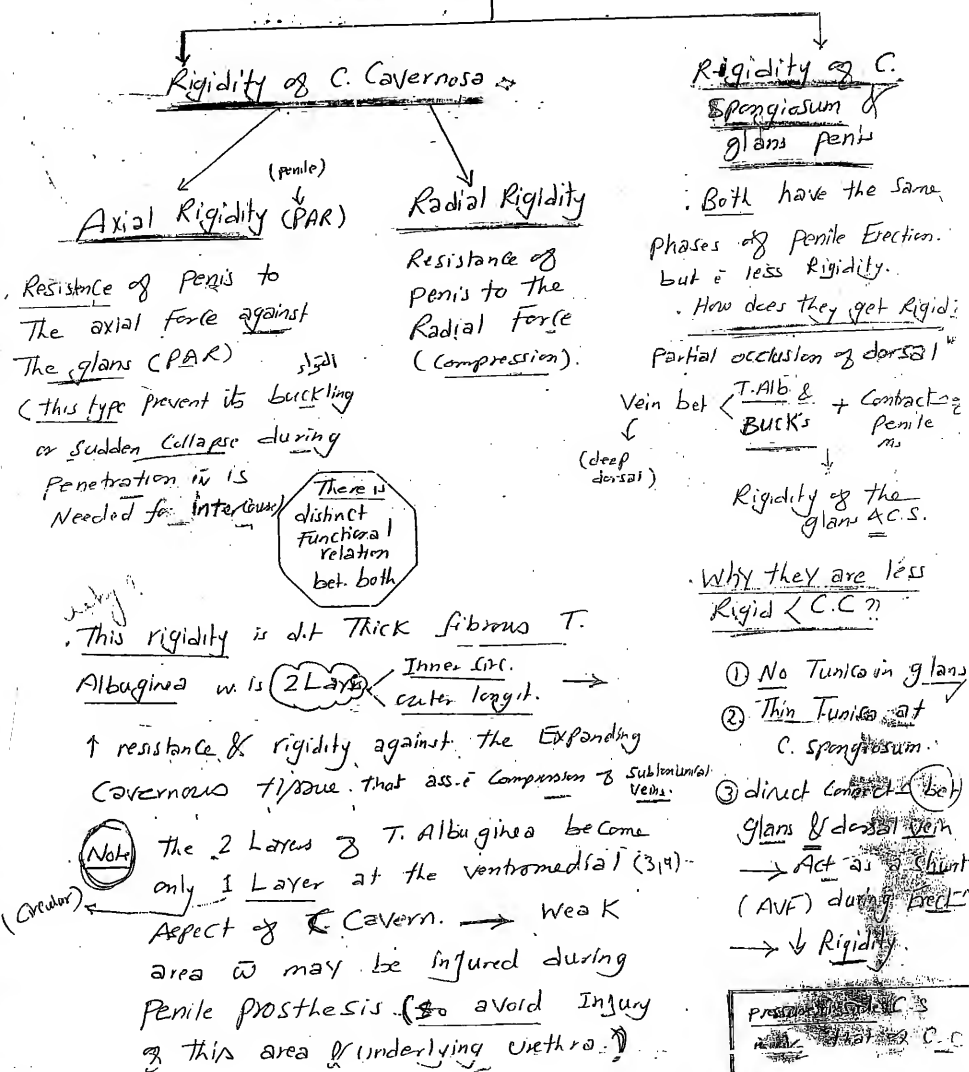
(Morning Erection)
mistake to consider
the morning erection
related to full bladder
(No relation)

Thermoregulation
Rigidity

2 Components of Erection (الانقباض = الارتفاع) 19

① Tumescence (Swelling): ↑ length & Circumference (girth) of penis at ↑ Blood Vol.

② Rigidity:



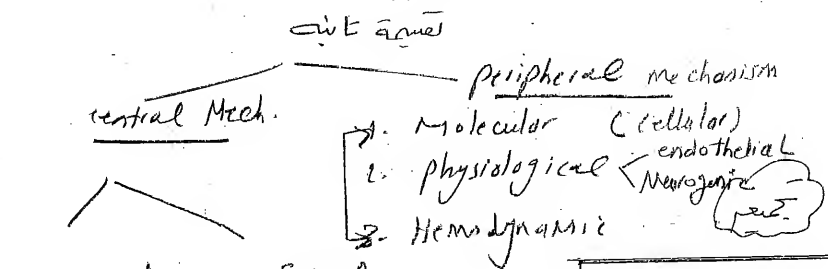
NB. ① Low Rigidity of:

glands is d.t. & helps to ↓ cervical Trauma.
C. Spongiosum is d.t. & helps to pressure the urethra opened during ejac. For passage of semen.

② Functional Relation b/w $\left\langle \begin{matrix} \text{Axial} \\ \text{Radial} \end{matrix} \right\rangle$ Rigidity to the basis for nocturnal monitoring of penile Erection by Rigiscan. ✓

③ Mechanism of Erection

- Cellular Mechanism
- Endothelial
- Neurogenic
- Hemodynamic



Supraspinal

1. cerebral centers
2. Hypothalamic ~

sexual $\left\{ \begin{matrix} \text{erectile} \\ \text{thought} \\ \text{visual} \\ \text{auditory} \end{matrix} \right.$

Spinal

• anatomy of penile nerves

NB	
<u>Neurotransmitters</u>	
<u>Types</u>	
A. <u>Erectogenic</u>	B. <u>Inhibitory</u>
• NO	Not normally released
• VIP	NPY
• SP	Endothelin-2
• ACholine	PGI ₂
• CGRP	PGF ₂
• PGE ₁	GABA
• Dopamine	
• oxytocin	

1. Cellular Mechanism

Cellular

Erection is d.t: Relaxation of
Smooth ms. of
C. Cavernosum →
↑ Blood Flow →
Erection.

Flaccidity: d.t Contraction of
These ms → ↓ Blood
Flow → Flaccidity

These Ms

Constitute: 50% of Cavernous tissue mass.

Formed of 3 Elements:

- Actin → Thin
- Desmin → Intermediate
- Myosin → Thick

Mechanism

Relaxation (Erection)

d.t → ↓ IC Ca^{+} d.t ↑ cAMP & cGMP
→ Block Ca^{+} channels →
relaxation → Erection.

InterCellular (epithelial)

InterCellular Communicating
Channels of Gap Junction
bet. The Smooth ms →
Allow Ca^{+} Exchange bet. Cells
→ Synchronized Contraction
&
Relaxation

These channels Formed of
(Connexin 43)

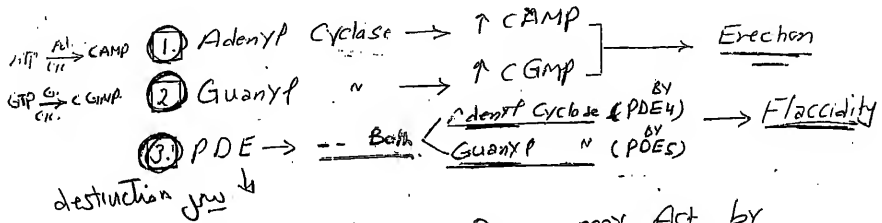
Contraction (Flaccidity)

d.t ↑ IC Ca^{+} d.t ↑ ATP →
Cross bridge bet Actin
& Myosin → Contraction
→ detumescence.

There are 3 Enzymes involved in Erection

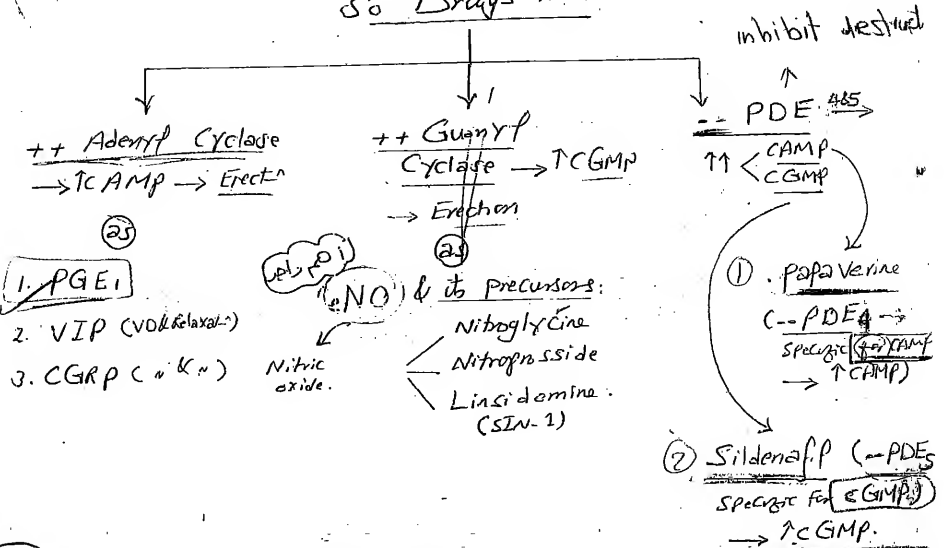
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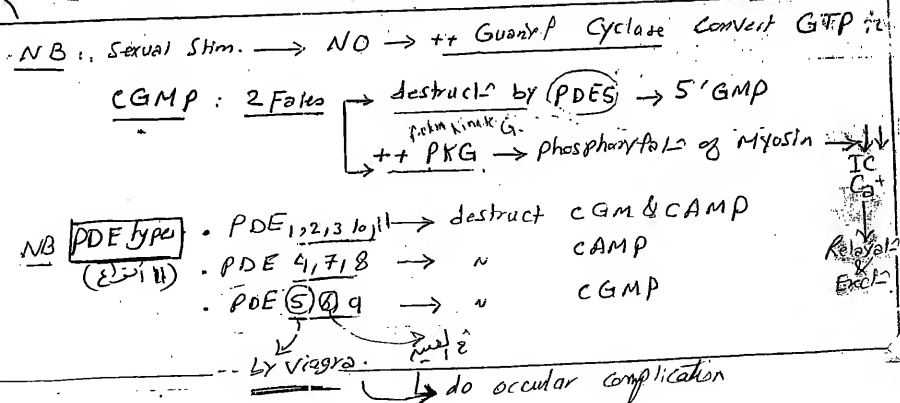


So Erectogenic Drugs may Act by
one of The Following
Mechanisms

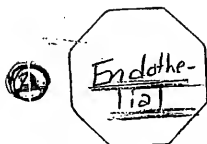
So Drugs that



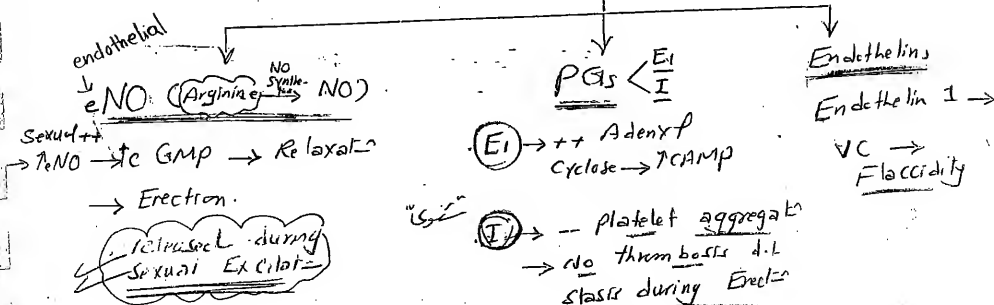
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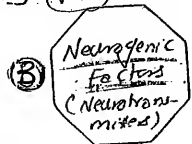
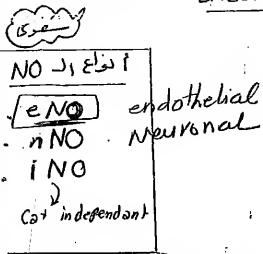
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Endothelium 28 - C.v. aa C.C release ③



NB < **NO & PGs**: Need High **(pO2)** (Not in venous blood or during Flaccidity).
Endothelins: High **(pO2)** → **its formation**



3 Neuro Transmitters released from nerve ending

Cholinergic (A. Choline) (d.t. Parasymp. Stimul.)

Adrenergic (Noradrenaline d.t. Sympathetic ++)

Non Cholinergic / Non Adrenergic
 ↑ **nNO**
 ↑ **VIP**
 ↑ **c GMP** & **PCAN**

+++ **nNO** Release
 --- **Adrenaline**
 Relaxation & Erection.

++ **α1** (Constrict) → **VC**
 ++ **α2** (Contract) → **VC**
 ++ **β** (Both) → **VD**
 Flaccidity

End. result VC (α:β 10:1)

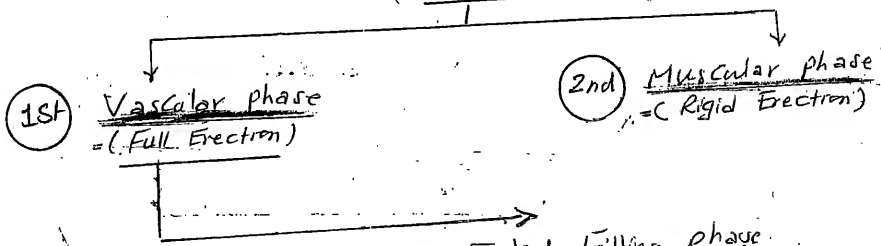
Relaxation

So Nitric oxide may be released from
 Both $\left\{ \begin{array}{l} \text{Endoth. (eNO)} \\ \text{Nerve (nNO)} \end{array} \right\}$ is the main Factor responsible for Erection.

is not
 (20% pool
 of blood)

(4)

4. Hemodynamic Aspects: Phases of Erection (2 phases)



- (A) Initial Filling phase
- (B) Tumescence
- (C) Full Erection

Veins for
 m → a

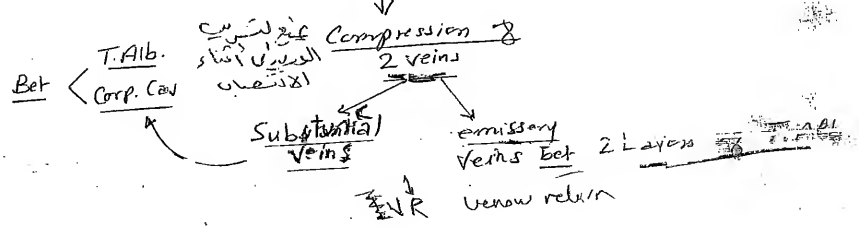
(A) Initial Filling

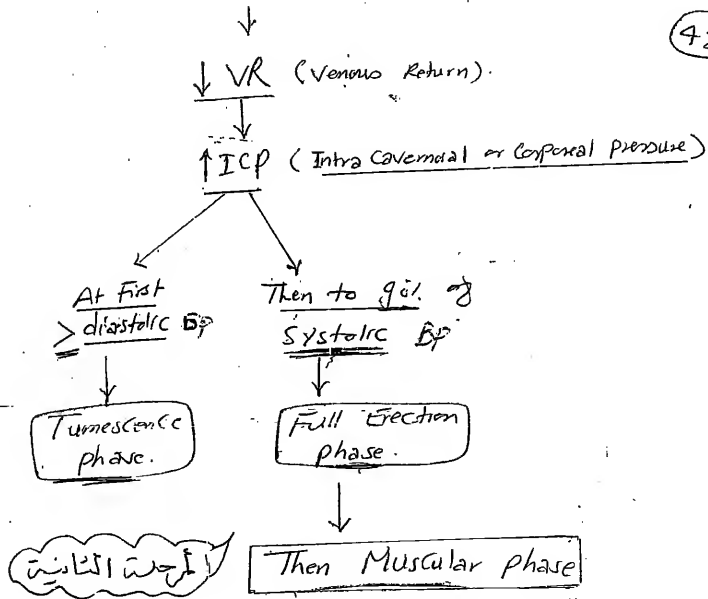
- during resting conditions
- Symp. ++ → Contraction
- C.C → only small Blood enters for Nutrition.
- Corporal a: 0.5 mm (diameter)
- Blood Flow Velocity: ≈ 15 cm/sec.

during stimulated conditions (sex):

- Under $\left\{ \begin{array}{l} \text{Endothelial Factors} \\ \text{Neurotransmitters} \end{array} \right\}$
- Corporal a: ≈ 1 mm
- Velocity: ≈ 30 cm/sec.

dilatation of Corporal a. & Tissue





Contraction of Ischio Cavernosus ms
 → more venous compression →
 ↑ ICP → No more blood enter
 (Cav. Tissue becomes closed) (ICP > Systolic BP)
 it's short stage d.t ms fatigue
 → NO ischemia or tissue damage.

⇒ So phases of Erection can be summarized to

- 0: Flaccid phase (Minimum flow - minimum press.)
- 1: Filling phase (Maximum flow - minimum press.)
- 2: Tumescence (↓↓ flow - Diastolic press.)
- 3: Full Erection (↓↓ flow - Systolic press.)
- 4: Rigid Erection (Minimum flow - maximum press.)
- 5: Initial detumescence: slight ↑ ICP
- 6: Slow " : slow ↓ ICP, slow reopening of veins & ↓ flow
- 7: Fast " : Rapid ↓ ICP, Rapid " " " " & ↓ flow resting.

ED

دفعه (Impotence) ←
 def. → Persistent inability to Initiate or Maintain Penile Erection
 sufficient for Satisfactory Sexual Relations. (For ≥ 3 mos)

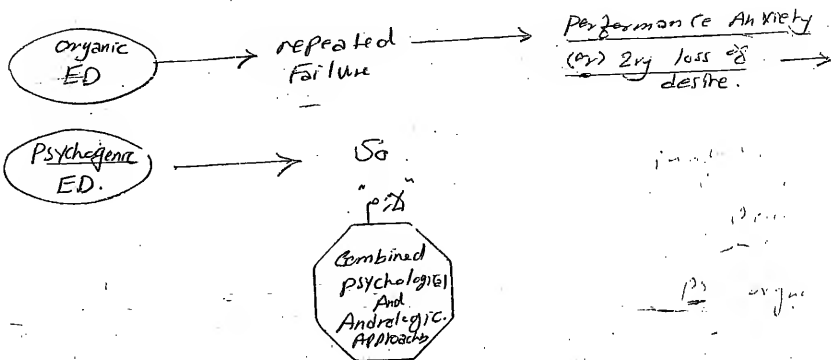
Types of ED

Psychogenic (50%)

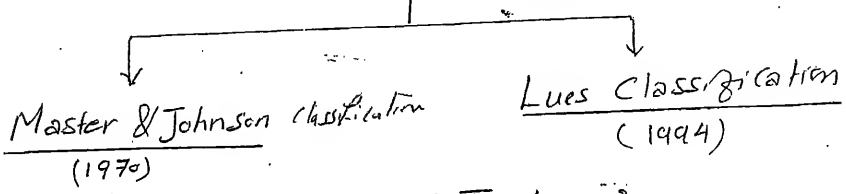
Organic (50%)

NB. Old % was $\frac{90\%}{10\%}$ Psychogenic / organic.

Most Cases are Mixed & No sharp distinction
 bet. the 2 Types because ED has
 marked Impact on well being e.g



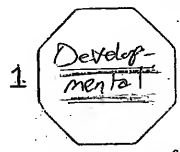
Psychogenic ED



1. Developmental
2. Cognitive
3. Neurotic
4. Interpersonal

- ① Type 1 : 3
- ② Type 2 : Depression
- ③ Type 3 : Marital disorders.
- ④ Type 4 : Mis information.
- ⑤ Type 5 : psychotic disorders.

Master & Johnsons



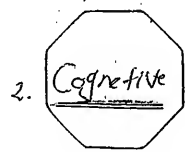
لأسباب التنموية

- ✓ ... Conflict parents-child relationship
- ✓ -ve Parents attitude Towards Sex

Infantile Masturbation

- ← عقاب ممارسة فهو يجعل Masturbation ← Traumatic 1st. Sexual Experience
- ← طرد في سن صغيرة ← Homosexuality

- ← اضطراب الهوية الجنسية ← Gender Identity disorder
- ← مشاعر متناقضة ← Gender Identity disorder



العرفية

- ✓ Sexual Ignorance الجهل
- ✓ Misconception مفاهيم خاطئة
- ✓ Religious orthodoxy

Approach or Assessment of

A Case of ED

A. History

B. Examination

C. Differentiate bet organic & psychogenic.

D. Determinants of course of organic.

أسباب
الرجولة
من
الجنسية
أو
النفسي

1. Personal Hx

Age
Marital status
children
occupat-

Special Habits

3. Hx of ED

onset, Course, duration
difficult initiate or Maintenance

Libido
Morning Erect-

Universal or selective

Ejaculate, PE or Anorgasm.
orgasm
Satisfac-

A. History

2. Sexual Hx

(i) Sexual development

(ii) Sexual Educat-

(iii) " Techniques (fore & after play & sexual posit-)

puberty, onset
1st sexual experience
masturbat-
homosexualit-

4. Medical - Surgical - Drug Hx

DM
HTN
PVD
LCF
CRF
Pelvic fracture or operat-
prostatid-
comp.
Drug induced ED
Circulat-
systemic

5. Wife / Partner Hx

Cooperat-
Attitude
orientat-

B. Examination

1. General Signs of:

Hypogonadism
systemic dis e.g. LCF or RF
Pulse, BP, Neurological
Sensation
Trophic changes
Atrophic
Atrophic
Breast Enlargement
Swelling
discharge

2. Genital exam

pylories + Penoscrotal (??) Hypogonadism
prostatic (PR) + BPH
prostatid-
Nodules
Stones
Reflexes

See Anorgasmic
avoid
anorgasm.

DM

1. Scrotal reflex
- 2 - cremasteric
- 3 - superficial Anal
- 4 - Deep "
- 5 - Bulbo-Governors R.

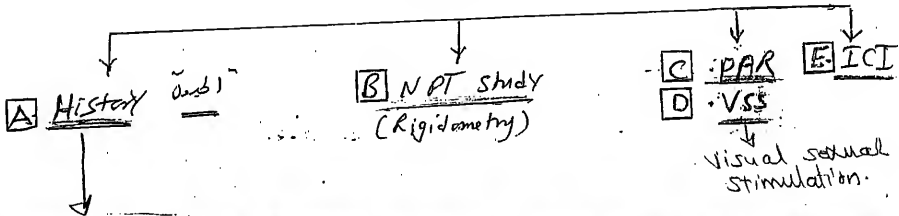
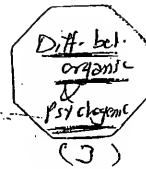


Table 7-1: Major differences between psychogenic and organic ED.

	Psychogenic ED	Organic ED
Onset:	Usually acute	Usually gradual
Course:	Variable	Steady
Circumstances:	Situational <i>usually "in the clinic"</i>	Global
Noncoital erection:	Rigid	Poor
Psychosexual problems:	Long history	Secondary
Anxiety:	Primary	Secondary

NPT study (Rigidometry) = Nocturnal penile tumescence (Rigiscan)

Principles:

- During sleep (REM sleep) nocturnal Erections occur & are ass. with REM phase of sleep.

Episodes: ② No. of Tumescence / Night: 4-5 episodes: (or 3-6)

③ Occurring / Every: 90 mins.

④ Lasting For ≥ 10 mins: (or ≥ 30)
(So Total Tumescence / Night = 90 minutes).

* Adv. - eliminate of psychogenic element \rightarrow differentiate bet. 2 types of ED. CNL NPT = NL Narrow-vascular

if $\frac{NL}{AbNL} \rightarrow$ Psychogenic
 $\frac{AbNL}{NL} \rightarrow$ Organic

Rigiscan 1988

Def: Ambulatory unit for measurement of:

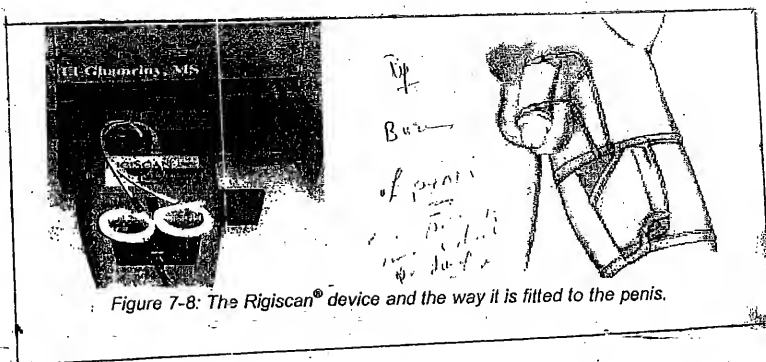
both penile $\left\langle \begin{array}{l} \text{Transience \&} \\ \text{Rigidity} \end{array} \right.$

Components: 2 Components:

① NPT data logging unit:

strapped to pt's thigh
during sleep - 2 Loops.
placed around i. base and i tip
of penis.

② Microcomputer & Printer: to record NO &
duration of Erections / Night.



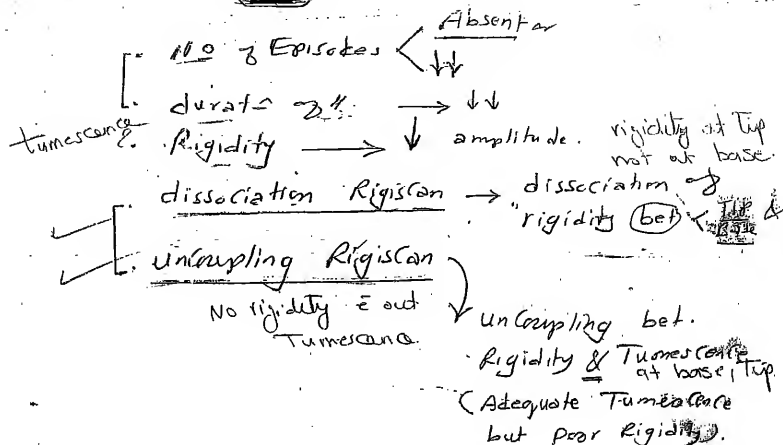
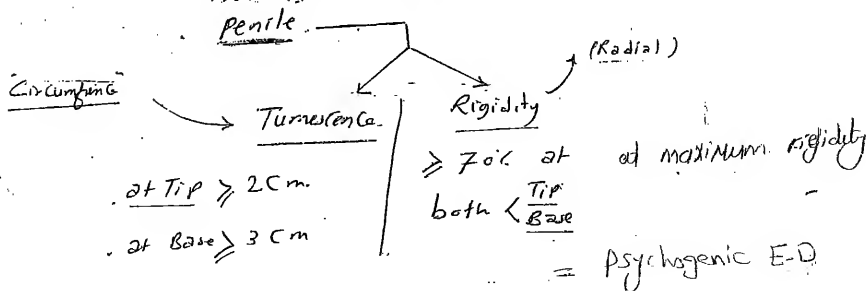
NPT data logging unit

Microcomputer & Printer



(Uniphi bio)

No of Erections / Night : 4-5 (or 3-5)
 duration of Each episode : ≥ 10 min (or ≥ 30)



2-3 Nights monitoring if 1st Night is NL \rightarrow No need for 2, 3 Nights.

Results: NL in Psychogenic ED Except (deep psychogenic, sleep disorders, depression, anxiety)
 ABNL = organic ED Except (Neurogenic ED & pelvic vascular disease)
 atherosclerosis of IIA \rightarrow \downarrow blood supply to penis \rightarrow penile neovascularisation
 Shunt in NIS during surgical act

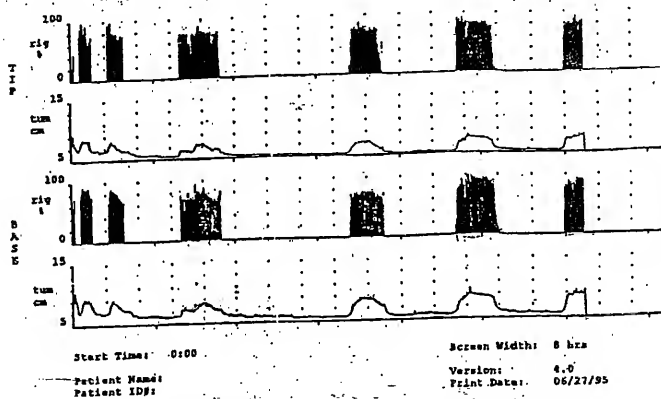


Figure 7-9: Graphic printout of NPTR in a normal 52-year-old male.

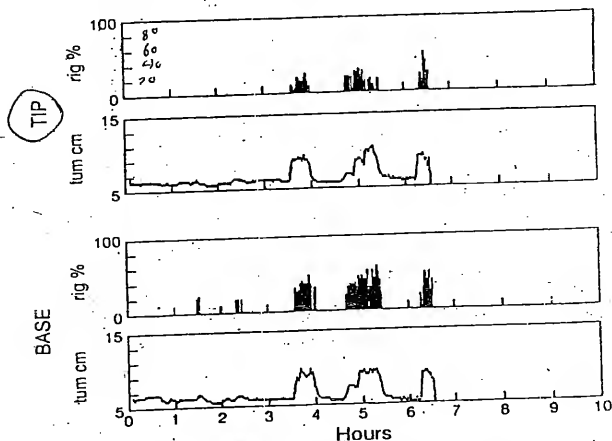


Figure 7-10: Uncoupling. Rigiscan® with adequate tumescence at base and tip, but poor base and tip rigidity.

Measurement of Penile Axial Rigidity (PAR) (DIR)

Infl. (b) Digital Inflation Rigidometer

Pressure Capacity of PAR Expressed in grams

> 500 grams Need For Penetration of Lubricated Vag.

> 500 gram normal

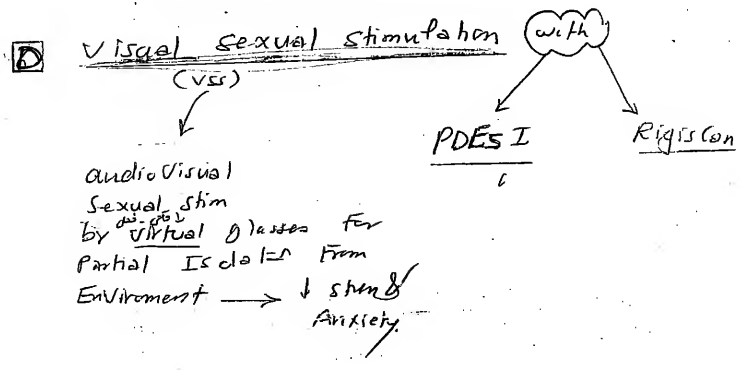
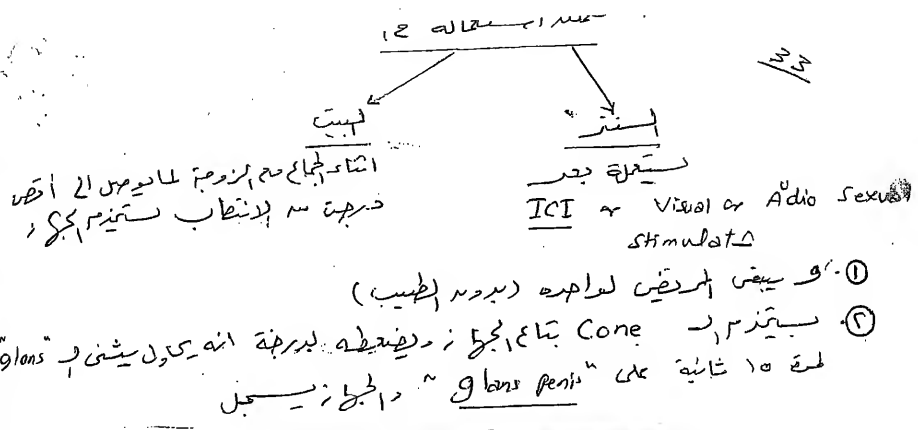
X Allow measurement of:

① Measure PAR

② ICP

③ Penile Temp.

4. Total Time of Erect.

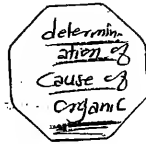


Men are penetrated repeatedly
by light in the right
5.0 per head frontal
up lobes

frontal
up lobes
11 17 18 19
10 11 12 13 14 15 16 17 18 19 20

③ VSR
VL
PDES I

34



Total
Free

- Testosterone level (Serum Morning)
- Prolactin (Serum Fasting)
- Blood Sugar → (BY HbA1C)
- Lipid Profile
- PSA
- LFTs

ND Hypogonadism was thought as rare cause of ED but nowadays there is significant effect of hypogonadism as men age & there is relation bet $\left\{ \begin{array}{l} \text{Hypogonadism,} \\ \text{Depression,} \\ \text{ED.} \end{array} \right.$

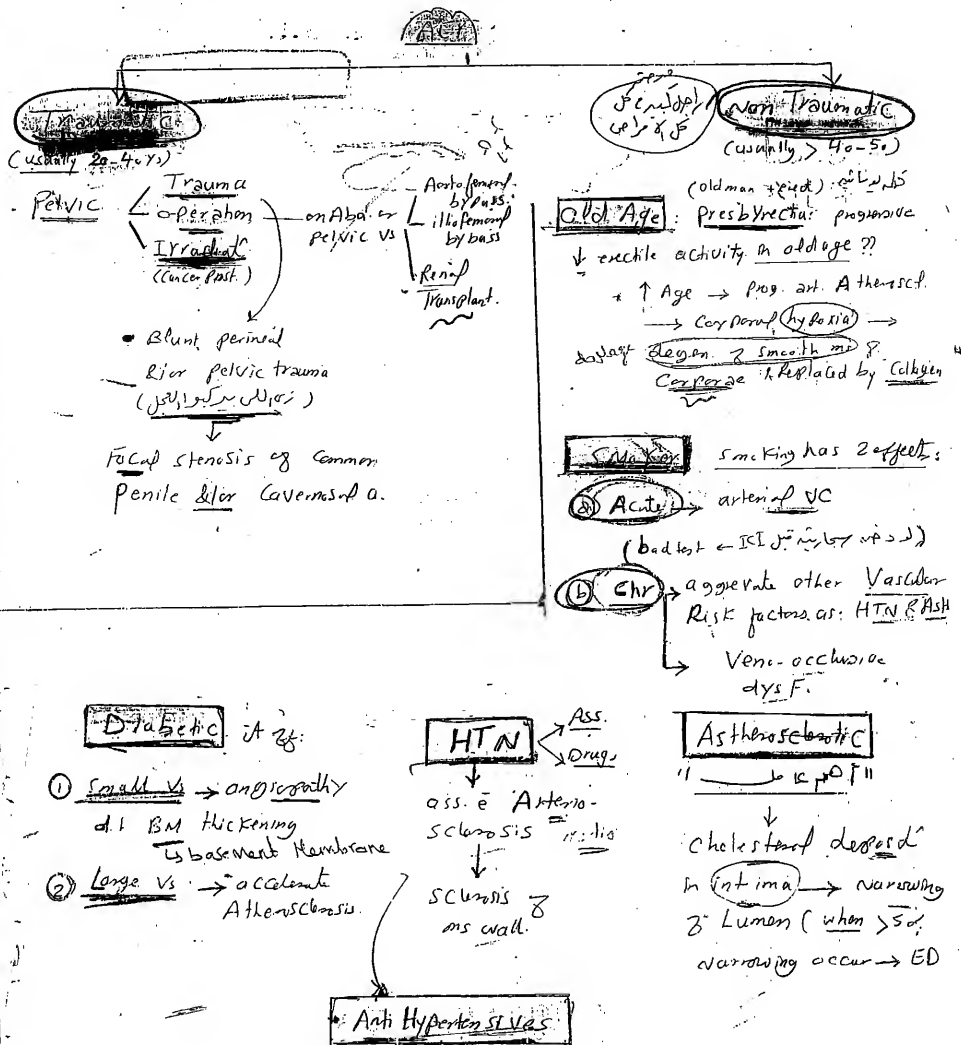
For
322 Day
LFT
PSA
LFT

② ED

①

②

ED Resulting from any occlusive disease affecting CV
 the penile aa. in presence of NL Corpora-vano-occlusive
 Mechanism → defective filling → ↑ time needed to
 initiate erection & for ↓ Rigidity.



AB to ED NB Synd & arterial ED

① Leriche's Synd. (thrombotic oblit. of Aortic Bifurcat.)

- ED
- ischemia & claudicat in Gluteal Regions.

② Iliac (Pelvic) Stenosis → Atherosclerosis of iliac aa. →

reducing

the pt has good erection at rest

but once active Coital Movem (Mantam) start → loss of erection.

False +
Rigiscan

- Explnat + Atherosclerosis of iliac aa → is compensated by format of collaterals w can induce Mantam erect at rest (but) active Coital Movem will deviate "steal" the blood into thigh ms → Pelvic Ischemia & ED.

(tth) Female superior position

action

II/3 ARTERIOSIS

1. Hx
 2. Exam
- diff bet org & psyl.
- Dign. AET

① General scheme For pds & ED but stem done on the following points to suggest arterial AET.

- ☑ History: Failed intiate & low ↓ rigidity
- loss of erection during coital movem
- Anti Hypertensives

☑ Exam: HTN, Absent peripheral pulsats.

② EDS:

differentiate bet organic & Psychogenic by ICI & Rigiscan

• Diagnosis of Arterogenic ED

- ✓ PPDO
- ✓ Arteriography
- ✓ MRI

• Radio Nucleotide Isotopes.

MD

- ICI differentiate (1) Psychogenic & organic (brof drugs) $\left\{ \begin{array}{l} \text{acute \& overall erect} \\ \text{red. 75\%} \\ \text{prolonged erect} \end{array} \right.$
- pelvic steel Ex JPF
- Used ① PGE1 (10-20 ug)
- ② Papaverine (30-60 mg) + phenylamine (Rigilin) (1-2 mg) / Bimix or trimix
- ③ Rigilin alone or Papaverine alone.

Look for \rightarrow $\left\{ \begin{array}{l} \text{onset of erect} \text{ ①} \\ \text{Rigidity} \text{ ②} \\ \text{maintainable (dura)} \text{ ③} \end{array} \right.$ $\left\{ \begin{array}{l} \text{NLly: NL erection occur} \\ \text{in } < 15 \text{ min w u} \\ \text{Rigid \& maintained for } \\ (15-30) \text{ mins} \\ \text{good rigidity} \end{array} \right.$

Interpretate \rightarrow NLICI in this case (NL ICI)

AET + $\left\{ \begin{array}{l} \text{Psychogenic} \leftarrow \\ \text{Neurogenic} \leftarrow \\ \text{Endocrine} \leftarrow \\ \text{Pelvic steel synd (PSS)} \leftarrow \end{array} \right.$

- ② in arterial ED: slow erection & loss of rigidity (slow > 30 min)
- ③ Venogenic \rightarrow Failure to maintain - Normal initiation
- ④ Neurogenic \rightarrow NL or exaggerated.
- ⑤ False -ve: anxious patient may give picture similar to arterial ED

to differentiate:

do Combined Injection & Stimulate

Tests (CIS) by VSS To release Anxiety

For 15 mins. gth (in) do sexual

stim. either by Manual or audiovisual

Complications: \rightarrow Prolonged erection & priapism.

So to $\left\{ \begin{array}{l} \downarrow \text{anxiety} \rightarrow \text{CIS test} \\ \text{defect psc} \rightarrow \text{exercise} \end{array} \right.$

What is

False -ve ICI?? \rightarrow anxiety

False +ve ICI?? \rightarrow NL

افضل طريق

ICI

افضل طريق

NL

Viagra

CIS

pelvic steel test

Cholest. deposits
in wall
(Intima)

→ ① Hypochlorite

(ED. oder \bar{e} occlusum γ > 50% γ
diam. metr.)

(2) DM

- angiosperm → occlusion of lumen
- Atrioventricular Atrioventricular

3. HTN

HTN : Arteriosclerosis

~~(15/5)~~ Naming 9

brunnen d.h.
Schwabisch by ~~am~~ Gengen

L Ant HTN

(4) Aging (presbyopia)

det Adh. C. \rightarrow fixation of CC
in the center of Sm. by
collagen

(5) Sinking

Acute V

1/2

Cinn

opposite $\left\{ \begin{array}{l} \text{with} \\ \text{HTN} \end{array} \right.$

also \rightarrow Vergewaltigung

Ans.

Simple

- DM

 14.7 N $\cdot \text{Hz}^2$

(Traumatic)

①. Laceration : Superficial or deep in Abdom. or Pelvic V.s

Such as :
• Acute laceration by gun
• iliofemoral

• Pelvic irradiate

②. Non Laceration

Blunt perineal - Blunt perineal,
Pelvic Trauma

Facet stenosis

Common perineal
(arteriovenous)

• False NL ICF &
Right Can
• NL Exits at rest &
lost at active motion

* Leriche Synd.

• Thrombotic obliteration of
Aortic Bifurcation → Ischaemia
→ ED + Claudication pain (thigh & Buttocks)

• Pelvic steal
Synd. Atherosclerosis
of iliac arteries... Collaterals
Compensate for pelvic supply
during rest... but not Active
Coital movement → steal of
Blood from Collaterals to
gluteal m. → lost erect.

Diagnosis

- (1) Hx : Failed Initials &/or lack of rigidity +
- (2) Exam. : see the Etiology
- (3) Inv.

(i) Diff. bet organic &
Psychogenic

• Rigidity
• ICF

(ii) Diagnosis of Arterogenic

• PPOU
• Arteriography
• MRI
• Radiolucens
• obsolete tests

penile Duplex (Pharmacogenic Duplex US) (PDU)

P. 43

We have to comment during the 2 phases:

1. Flaccid phase
2. Erect phase (after pharmacologically induced erect)

during Flaccid phase

NL findings

Cavernosal artery diameter = 0.3 - 0.7 cm (0.5 cm)

Cavernosal tissue Homogeneous Uniform Echogenicity

in Peni (Echodense areas)

Image:

1. Corpora Cavernosa
2. Corpus Spongiosum
3. Tunica Albuginea
4. Cavernosal artery diameter

during erection phase (after ICD)

Look for the 1st 5 mins after After injection

& comment on

ویڈیو لے

Imp. less

PSV < 25
EDV > 7 } AbNL

PSV : 25-35 } equiv &
EDV : 5-7 } Repeat.

✓ PSV > 35
✓ EDV < 5 } NL PDU

1. Cavernosal artery diameter → should be 75% of its base (Flaccid level)

2. PSV → should be > 25-35 cm/sec. End diastolic should be < 5-7 cm/sec.

3. EDV → NL = 1

4. Resistance index → must be present

5. Pulsations : must be present an important indicator for health of the artery because PSV > 25 but is AbNL finding

used For D 2:

- Arteriogenic ED (Sure D)
- Venogenic ED (not sure D)

Arteriogenic ED
PSV < 25
Cav. 2. diameter < 75% of basal level

Venogenic ED
EDV > 7
R.I < 1

What is R.I ?? = $\frac{PSV - EDV}{PSV} = 1$
(because NL EDV is zero so)
R.I : • NLLY = 1
• in venogenic ED (↑ EDV) → < 1

(NO) ONLY during: Full erection the intracavernous pressure should \geq diastolic pressure so that blood enters the penis only during the systole & blood flow velocity during diastole should be (Near) Zero.

in Abnully Corpora Venous leakage: Intra cav. pressure may be $<$ diastolic \rightarrow \uparrow diastolic Flow velocity > 7 cm/sec. \rightarrow Venogenic Impotency.

Adv. of PDDU:

- ① minimally Invasive
- ② 1st line test for \varnothing arteriogenic ED
- ③ Can Indirectly diagnose Corpora Venous ED \rightarrow venogenic.
- ④ In contrast to arteriography: it:

invasive & gives only anatomical info

non invasive & gives functional info

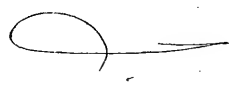
not invasive

disadv.

① False +ve: d.t. sten. (do CIS).
[Variety in cavernosal artery anatomy \rightarrow False Results]

② test should be done during 1st 5 min: (a) will allow easy assessment of artery (but) after 5 min erect \uparrow & \downarrow w. Cant allow assessment of corpora-venous occlusion (JPG Excl.)

③ Variety in technique d.t. experience & Operator
Position of probe: should be at proximal of arterial branching



Arteriography (2) ^{artery}

Indict: ^{prospectively} to detect ^{localized arterial stenosis} before ^{Penile Revascularizat} (Post traumatic) before
So, indicated only in Small No of Cases.

Method: G: A → I-V diazepam.
 ICI of Vaso-active drugs ^{then} selective cannulate of Int. iliac or Int. Pudendal ^{then} injected diluted contrast sol. to visualize anatomy & Radiography of Cavernosyl aa.

MRI (3) ^{some studies showed: significant difference in (MRI) Picture of Flaccid penis bet NL & ED Males}

Radi nucleotid Isotope (4) → For evaluating penile Blood Flow

- Duplex →
- Finchomyl
- Arteriography →
- Angiography
- Radionucleotid →
- (hemichrom)

¹³¹I labelled Human serum Albumin (5)
 Given IV & the flow through penis is detected ^{then} ICIN → if the level of ¹³¹I-HSA doesn't rise after ICI → Vasculogenic ED diagnosed.

(X) Obsolete tests (used during Flaccidity)

① Penile Brachial pressure Index (PBI)

Ratio of: Brachial press. & Penile systolic pr. (P) < 0.6 → arterial insuff
Can be done: after & before exercise & diff. > 0.15 → pelvic stenosis

② Doppler wave Form analysis:

• assess flow in penile aa. not the Cavernosyl aa.
 • detect Flow in dorsyl a. (minimum Rob in erect)

③ Penile thermography: → by urethral Catheter

(ED)

Causal H₁

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Viagra
ICI
PDE5 Inhibitor
Revascularization

① Causal H₁

- stop smoking
- Hyperlipidemia
- Revascularization H₁
- Control DM
- stop anti HTN H₁

② Viagra

③ ICI

④ VCD

Vacuum constriction device

⑤ Penile Implant

(alternative to Revascularization)

NB: Revascularization

1. Indications (in very far pt can be achieved)

(E All success
Rate = 70%)

- Age < 60
- No DM
- No diffuse art. pathology
- No delayed ICI Response.
- No Venous dysF.
- PSV > 30 cm/sec.

↓ operations

- ✓ A. Michel I: Inf. epig. artery anastomosed directly to Corpus Cavernosum (High failure Rate)
- ✓ B. Michel II: Inf. epig. artery anastomosed to dorsal Penile artery (so blood pass retrograde from dorsal Penile artery to Pudental a.)
- ✓ C. Inf. epig. → anastomosed directly to Cavernosal a.
- ✓ D. Virag op.: Inf. epig. anastomosed to the deep dorsal vein.

(over) inf. epig. anastomosed to

- Corpus Cavernosum (Michel I)
- Cavernosal a. (Michel II)
- dorsal Penile a. (Michel II)
- deep dorsal vein. (Virag)

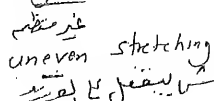
Venogenic ED

(Veno-occlusive or Corporo-Venous ED)

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- Def → inability to trap the blood in the Corpora Cavernosa to maintain the Erection.
- So There is NL Initiation but Failed maintenance for few seconds; maximum 2 mins.
 - No loss of Erection: during movement as in pelvic step smd.

Causes: divided into 5 types (Lue, 1988)

- ① type I: Cong. Ectopic Veins
 - d.t large ectopic veins existing directly from Corpora
 - usually found in young men & 1^{ry} ED.
- ② type II: Abnormalities of Tunica Albuginea
 - DM
 - Aging
 - Pyronia's
 - Penile Trauma (during Erecto)
 - uneven stretching in: 
- ③ type III: Abnormalities of Corporal smooth ms → In adequate Relaxat
 - [d.f] Ischemia induced atrophy, Fibrosis & degen. of ms: (in)
 - DM
 - Aging
 - Priapism → cholesterol deposition
 - Hypocholesterolemia → Altered Collagen of C. Cav.
- ④ type IV: Inadequate Release of Neurotransmitters → No
 - DM
 - Neurogenic ED
 - Psychogenic ED
 - Heavy smokers
- ⑤ type V: Abnl Acquired Venous Communicat (Fistula) (TTP)
 - bet Corp. Cav. & C. spong. & glans penis
 - Trauma
 - Transurethral Surgery
 - priapism after shunting operatn

NB1

Structural alterations to the fibroelastic components of the trabeculae may cause a loss of compliance and an inability to expand the trabeculae against the tunica albuginea to compress the subintimal venules. This may be a result of:

- Aging.
- Increased cross-linking of collagen fibers induced by non-enzymatic glycosylation and hypoxia.
- Altered synthesis of collagen associated with hypercholesterolemia.
- Surgery or trauma to the penis.

NB2: Combined arteriogenic & Corporoarteriogenic ED:
many pts have combined 1 & 1 ED d.t:

- DM
- Old age
- Smokers
- HTN
- Hypertension

Thus: Vasculogenic ED
May account for
80% of cases of ED

Diagnosis

1. History:

رئیت (تاریخچه) بیماری و علل آن
Failed maintenance (lost in < 5 min)

Possible causes: DM, Smoking, operation, Hypercholesterolemia

2. Exam:

رئیت (تاریخچه) بیماری و علل آن
Pyromi's
Scarring of pelvic op.
General
Local

3. Inv:

(A) to differentiate bet. organic & Psychogenic:

- ICI
- Rigiscan

(B) Detection of Corporo Venous Causes: (D of Venogenic ED)

PPDC Non sp.

pharmaco Causes: no sometry
Dynamic as

Cavernosography ± Alms
or combined
± Cavernosometry

The Specific for D of Venogenic ED

58

① PPDU:

علی ساقی حالت ادرت با استفاده لابرطام دین ادرت لافس در ایه
 انتحاب (ES) .. دروشن مرس که ← طبعی صراطع Venogenic ED.
 [دره خطا شایع می باشد و اشتباه]

How to Reach to ES: BY (ICI) + $\left\{ \begin{array}{l} \text{large doses} \\ \text{Combined Agents} \\ \text{CIS} \end{array} \right.$

PPDU: Can diagnose Veno. ED indirectly, & should be confirmed by Cavernosometry.

If PPDU shows: $\left. \begin{array}{l} EDV > 7 \text{ cm/sec.} \\ RI < 1 \end{array} \right\} \rightarrow \text{Venogenic Impotence}$
 (after ES test)

② Cavernosography: عروق

Radiologic visualization of Penile Venous drainage by inf. of Radiopaque contrast media in

Flaccid penis → of little value (Can't diagnose leakage occurring during Erect)

③ Dynamic Cavernosometry Saline

Rubber at base of penis

Two 21 gauge needles inserted in both sides of Corpora Cav., one connected to infusion pump & the other to pressure monitor

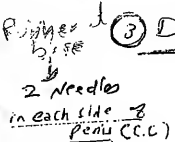
start the infusion of saline & comment on erection

① Flow rate needed for induction of erection (mL/min) $\approx 100 \text{ mL/min}$

② Flow rate needed to maintain erection (Maintenance flow rate) $(20-50 \text{ mL/min})$

stop the pump & cut the rubber band & observe the ICP for 5 mins:

↳ IntraCavernosal pressure



Stop infusion & cut rubber band
 ICP
 در 5 دقیقه

Venogenic ED diagnosed if:

ICP < 90 mmHg

Induct flow rate > 100 ml/min

Maintenance " " $> 20-50$ ml/min

④ Dynamic Cavernosometry - Cavernosography: (DICC):

the same technique but \bar{e} inj. of Radio contrast medium & Veins are Visualized.

⑤ pharmacologic - Cavernosom. Cavernosography: ICI: best

it is the Method of choice for diagnosis.

ICI of vasoactive drugs used to \downarrow the amount of saline perfusion needed to induce erection.

Technique 2, 21 butterfly gauge needles on both sides of corpora, inject 0.5 ml Trimax parv. Rigid. PGE1 & Rubber at the base of penis for 2 mins then removed.

NB
Cavernosography
VLLY shows absent
Visualization of
penile Veins
in venogenic ED
of a Coagulation
leakage.

FR = Flow rate

Trimax

FR Ind. 30-40
FR Maint. < 5 ml
ICP < 45 mmHg
30 sec.

Infusion
tipp

Erection \bar{e} ICP = 90 mmHg

Then Comment on

(2)

FR. Needed For
Induct. For
Erection or ICP
(30-40 ml/min)

FR. Needed For
Maintenance
Erection or ICP
(< 5 ml/min)

Then \uparrow ICP to 150 mmHg

Then stop Infusion

Then:

CATCH THE VEINS & ICP OVER [] P. 51
 After stoppage: [NTG: should be < 45 mm Hg in 30 secs.]

then inject Radio Contrast: Media to visualize the veins (Cavemography)

Summary of Values

MNE or Psychogenic ED

Venogenic ED

1) Induction of Erection 30-40 ml/min

60-120 ml/min

2) Maintenance of Erection < 5 ml/min

$\gg 30$ ml/min

3) \downarrow ICP over 30 secs. after stop of infusion < 45 mmHg

> 45 mmHg

NPV: Induction Rate not important as it depends on Penile Size

Age & Ht of Venogenic Importance

TYPE	TREATMENT
Congenital ectopic veins:	Venicoligation operation "stripping & ligation of excessive veins". The deep dorsal vein and/or the cavernous veins can be ligated according to the condition. <u>obscure</u>
Abnormality of the tunica albuginea and cavernous smooth muscles:	Poor response to venous surgery. They are best treated by <u>penile prosthesis</u> .
Inadequate release of neurotransmitters:	According to the cause: • Pharmacotherapy in neurogenic type. (Viagra) • Psychological counseling of sex therapy in psychogenic type. • Arrest of smoking in heavy smokers.
Abnormal communication:	Surgical correction of the shunt or the fistula.

disadv
 • Success Rate 50%
 • High Recurrence Rate
 ↓
 Not done now.

1) Cause of Ht (See Above) →

2) Viagra

3) ICI

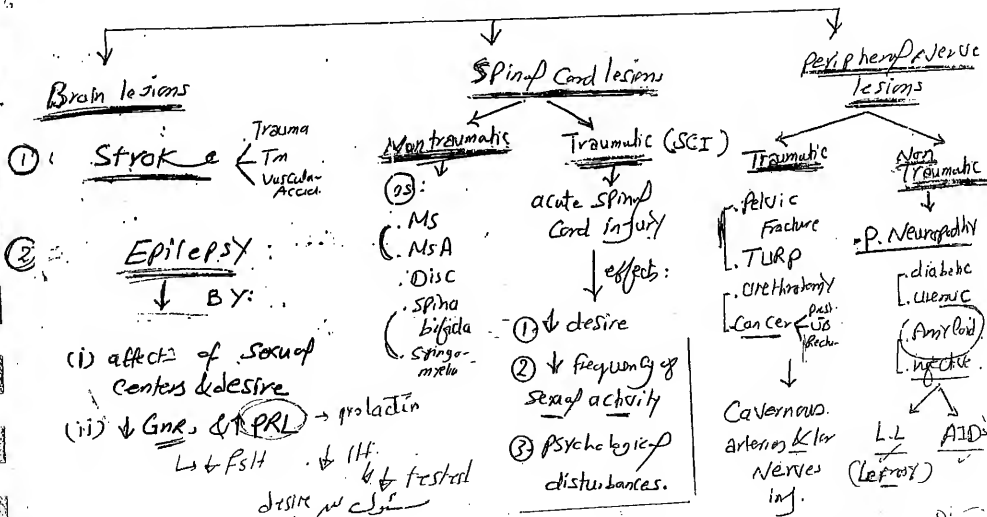
4) Prostheses

5. VCD

Neurogenic ED (10-20%)

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AET:



3. MS → ED & Bladder dist.

Multiple Sclerosis ↓ BY

(1) affect of sexual areas of Brain & Spinal Cord

(2) Psychogenic

4. MSA (Multiple System Atrophy)

● Parkinsonism

● Cerebellar ataxia

● Autonomic failure (Shy-Drager Synd)

↓ Postural Hypotension
↓ Bladder dysfunction
↓ ED

Spinal Cord injury & Erection:

(SCI & ejaculation --- ZPT)

① Acute (erschock) Stage: Complete loss of Reflexes & erection

② Recovery Stage: Acc. to level & completeness of injury:

• Below T₉ → Psychogenic may still occur

• Above S₂ → lost Psychogenic only

• S₂, 3, 4 → loss of both Psychogenic & Reflex. erect.

Psychogenic mediated by limbic center (at T₁₂ & L_{1,2})

NB Psychogenic mediated by

Cerebral centers → T₁₂/L_{1,2} → Psychogenic Erect.

Diagnosis

- ① History
- ② Exam.
- ③ I.N.V.

LA

① Suggestive of Somatic Defect:

pudendal n. affection

DM
Tb
Tb
Tb
Tb

- DM
- Head or spinal trauma
- MS
- Toxins
- Brain Tors

② Suggestive of Autonomic Defect: th 10-11-12, S 234.

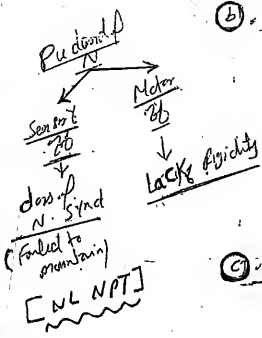
- DM
- Pelvic Surgery
- bladder bowel dysf.
- Postural Hypotension.

(any)

③ Sexual History

②. Failure to initiate → autonomic affection (Cavernosus N.)

①. Failure to Maintain → Dorsal Nerve Synd. → Post
transmission of sensation from genitalia → occur d.t. sensory effect of pudendal N.
NL NPT (Rigiscan) Biothesiom.
diagnosed by Dorsal Nerve Study



± 455 e difficult ejac.

③. Loss of Rigidity → Affection of Motor part of Pudendal N. → Absent perineal ms contract.

False Normal rigiscan → Neurogenic pelvic steal synd

Examination:

physical ex. → local - General - Neurological.
may reveal absent or reduced reflexes. Special Exam:
and sensation

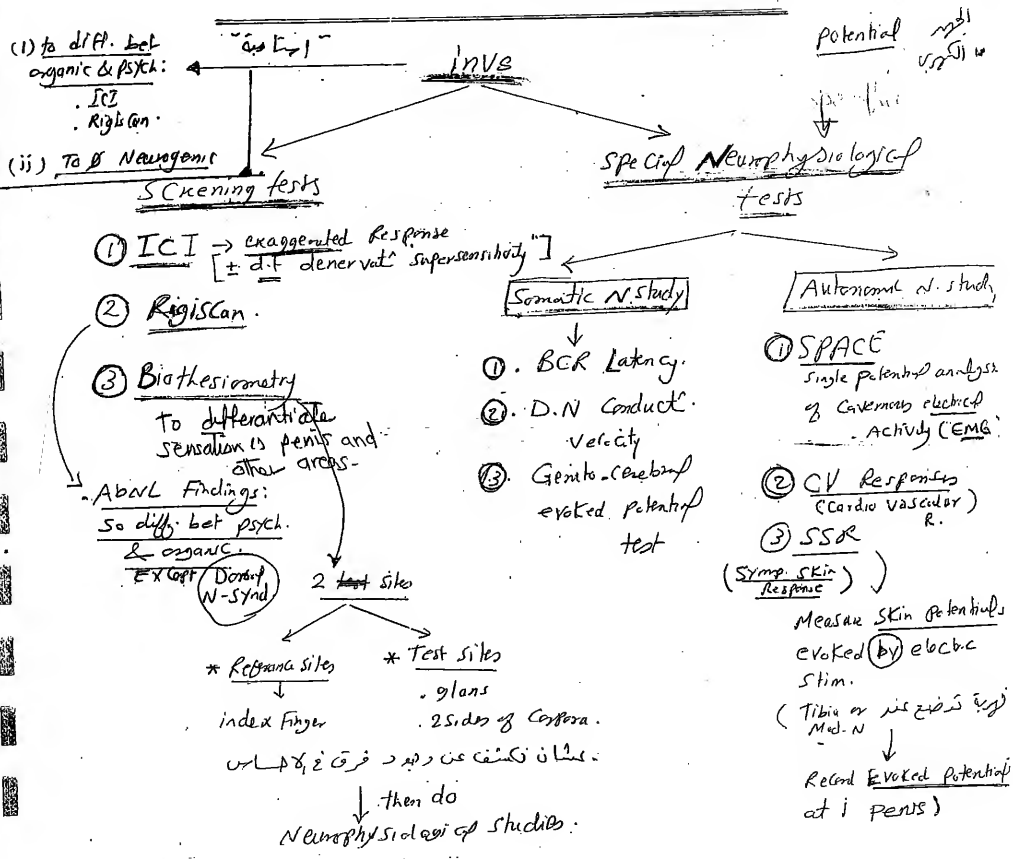
Reflexes (See Anaph)

Penile Sensation: by Pin prick testing
Temp. testing (by NHP snail)

Glans of penis → Bulbo-cavernosus Reflex (Sacral Reflex testing)
(BCK) ↓
(detected in 70% of NL males)

Cont. of Penile
Cont. of Ext. anal.

if Absent in ED → Signifying
ED due to P.N



Neurophysiology of Tests

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Somatic N. Study

→ ① BSR Latency Bulbo cavernosus reflex.

4 electrodes — 2 Stimul., 2 recording.

2 Stimulating Ring electrodes

Compressing the expl.
→ one expl.

2 Recording Needle electrodes

inserted at Rt & left
ischio bulbos cavernosus muscles
to Record Response.



only there's latent period bet. application of stimulus & recording the response; if prolonged ⇒ neurogenic def.

② if the recording Electrodes put at:

✓ Central Cortex
✓ Spinal Cortex

✓ Glans & Penile Base

→ ② Genito-Cerebral Evoked Potential

→ ③ Dorsal N. Conduct-velocity

Autonomic N. Studies

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single potential analysis of cavernous electric activity

EMG ① SPACE: using cavernous EMG to record cavernous electrical activity

② CV Response: Record changes in $\frac{HR}{BP}$ during:

→ Cardiovascular → quiet & deep breath response → postural changes.

Not dependable

↓
So evaluate the autonomic supply (indirect tests)

③ SSR: Skin sympathetic response

Ph - 8 Neurogenic ED

awake

① Remove the cause if possible

- Control DM
- # Alcohol
- Uremic HT
- dis. agents

② Pharmacotherapy: Viagra

③ ICI → suitable for pts w/ irreversible nerve damage

but use lower doses why? det. denervation hypersensitivity causes exaggerated response.

④ Surgical HT (i.e. Failed or Refused ICI)

• Penile prosthesis.

• Semi-rigid: useful in pts using Catheter.



(But) Generally:

inflatable implants more suitable than semi-rigid (to avoid erosion of implant).

⑤ Pharma
5- VCD

1st 5A

① Peyronie's dis. (PD) & penile deviation 70%
(Penile fibromatosis; plastic induration) of penis

dis char development of fibrotic plaques in the
Tunica Albuginea of corpora cavernosa usually
on the dorsal aspect & may extend to the lat. &
vent. aspect.

pg 1000 (NB) → penile fibrosis: is a fibrotic process that
involve the corporeal erectile tissue.

(AET) → theories: Cong. Traumatic Infective Neoplastic Miscellaneous
3B
↓ VUE

① Cong. + FH ± in 2%
(AD inheritance postulated)
↑ incl of HLA A1 B27 CQW

Ass. Cong. Familial Abnormalities of
Fibrous Tissue Formation:

↑ tendency to keloid
↑ tendency for scarring
Scarring of plantar fascia → Lederhose dis.
Scarring of palmar fascia → Dupuytren's dis.
Tympanosclerosis

② Traumatic (Most Accepted)

Repeated minor trauma during excessive or vigorous intercourse
or microtrauma ICI VCD → pathogenesis

③ Infective: (not accepted)

④ Neoplastic: Some cases ± Ass. c. Carcinoid
Synd → ↑ serotonin level → ↑ Fibrous tissue formation

⑤ Miscellaneous: ass. dis. ±
(Risk Factors) Aging

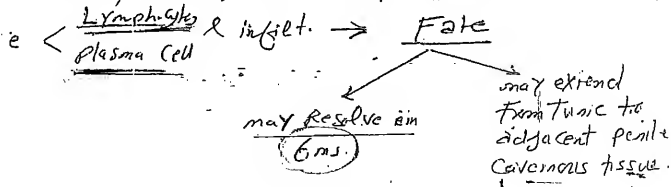
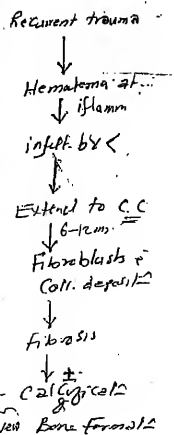
3A
2D
DM
Arteriosclerosis
Autoimmunity
Atherosclerosis

Drugs → benzotriazine
BB

⑥ VUE
has Antifibrotic defect

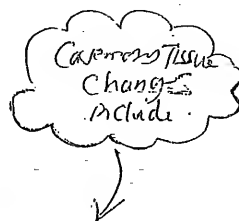
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Repeated minor penile trauma \rightarrow Microvascular damage
 \rightarrow hematoma formation in the vascular loose areolar CT
 sleeves bet. Corpora Cavi & Tunica Alb. (in the
 sub-tunical layer) \rightarrow Vascular inflamm. React



Fibroblasts replace the inflamm. cells \rightarrow
 \uparrow Collagen deposits \rightarrow Fibrosis & fibrous
 plaques formation.

Calcificat & or bone format may occur



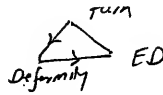
(Enoch 2011)

NB Phases of 1st

- (1) Acute: 8-24ms:
 . Pain
 . Some curvature
 . Penile Nodule
- (2) Chr.: > 24m.
 . Stable plaque
 . \pm Calcification
 . Curvature, ED

- (1). \uparrow Type III Cell. > Type I in Tunica & C.C (also Type III \uparrow in VED)
- (2). upregulation of TGF- β & Fibron (TGF- β \rightarrow Tissue repair & scar formation)
- (3). \downarrow Elastic fibs.
- (4) \uparrow ROS

CIP



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onset: either

- Most Cases: Pain → Feel a lump → Deformity
- Few Cases: report penile Curvature that occurs over the night (suddenly) & remains stable

Pain

• during early stages (3-4ms) → relieved by Fibrinolysis.

• During Erections

Mass (plaque)

> 1.5 cm

• Asympt

• midline; usually dors of > Ventral

Deformity (during Erection)

Types

① Curvature (Common)

• upward: in dorsal effect

• downward: in ventral "

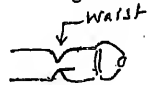
• Lat: in lat effect

[deviate Towards the plaque]

② Hour glass deformity =

pen Flail penis: Circumferential

effect → flaccidity of distal end (glans)



③ Shortening

(Psychogenic ED)

NB. May precede the Deformity

① Arteriogenic: d.t. ass. vascular dis, HTN, DM. & Asth.

② Venogenic ?? (see VED)
 no penile tumor

③ Neurogenic: dorsal Nerve affect

④ difficult intromission (if)
 dif. Curvature (if > 30°)

⑤ lost rigidity: distal end flaccidity (Flail penis)

⑥ Psychogenic: d.t. Shortening > Curvature → Performance anxiety.

DD (A) penile deviat

• Cong.

• Chordee & Hypospadias

• urethral Manipulat → Synd

Ventral deviat
 d.t. Fibrosis & any urethral Manip.

(B) Penile Mass

• Trauma
 • TM
 • Gumma

Diagnosis of PD

(obj. & subj.)

A. History $\left\{ \begin{array}{l} \text{pain} \checkmark \\ \text{mass} \checkmark \\ \text{deviation} \checkmark \\ \text{ED} \checkmark \end{array} \right. - \text{ICI} - \text{VED}$

B. Exam $\left\{ \begin{array}{l} \text{Mass} \\ \text{deviation} \\ \text{Sensate} \end{array} \right.$

C. Inv.:
1. ICI $\left\{ \begin{array}{l} \text{diff. bet organic \& psych.} \\ \text{detect The deviation (Curvature).} \end{array} \right.$
2. Rigiscan $\left\{ \begin{array}{l} \text{as ICI} \\ \text{Essential bogen H} \end{array} \right.$

3. Vascular Inv. (PPUD):
 $\left\{ \begin{array}{l} \text{Asses} \left\{ \begin{array}{l} \text{Blood Flow} \\ \text{arterial} \checkmark \\ \text{Venous} \checkmark \end{array} \right. \text{System} \\ \text{detect} \left\{ \begin{array}{l} \text{Fibrosis \& hyperchole} \\ \text{Calcification} \\ \text{Consistency of plaques} \end{array} \right. \end{array} \right.$
4. Neurological Inv.: To detect dorsal N. defect

5. X Ray: \rightarrow Calcification (Indication of Surgery)
6. MRI: preoperative visualization of the anatomy.

Treatment of PD

>7 (Basic) ICD
 • avoid VCD surgery
 <2y for chance of spont. resol

Medical (indications)

Surgical

1. 1st 2y (Acute or unstable dis)
2. Mild pain
3. Mild deformity (Angulation > 30°)
4. Uncalcified plaques
5. No ED (NL rigidity)

- ① > 2y (Chr. stable)
- ② Severe pain
- ③ deformity (> 30° angulation)
- ④ calcified plaques
- ⑤ ED

NL intromission during Coitus.

A Medical Ht we use (≥ 6ms)

Oral

IL

- ① Tamoxifen (20-40mg 3ms)
 Antifibrotic
 little efficacy
- ② Colchicine: Antifibrotic (0.5-2.5 mg/d)
- ③ VITE (600-800 mg/d)
 Effective
 little efficacy
- ④ NSAIDs - Indomethacin
- ⑤ PotABA (K. Paraminobenzoate)
 Antifibrotic
 12 g/d for 1 Year.
 S.E → GIT upset.
- ⑥ Systemic CS.

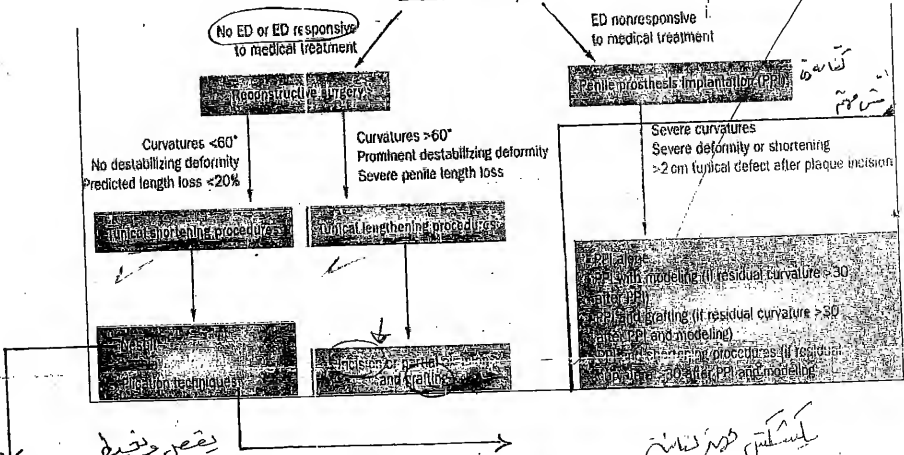
- ① CCB (Verapamil)
 15mg diluted in 10ml & injected
 12 wks for acute & chr. dis
- ② Collagenase
 use for in minor deformity
- ③ CS: C.I as → Betamethasone
 atrophy & death of healthy tissue + Pain.
- ④ IFN-2b 5x10⁶ IU for 1y.

Not Dose.

Surgical H

- ① > 2 Ys
- ② Severe pain
- ③ Severe deformity (> 30° angulation) $\xrightarrow{\#}$ Coital Intermission
- ④ Calcified plaques

look for Penile - Rigidity (ED)



① Ellipse Excision of NL

Tunica opposite to the plaque $\xrightarrow{\text{then}}$ Suturing

- adv . More potent
- . long standing
- disadv . More Traumatic

② Plicato or Multiple Parallel Plicato Technique (MPP)

Multiple parallel plicato Sutures done on ! opposite side of the plaque \rightarrow out tunical Excision.

- adv . Simple
- . less traumatic
- disadv . less potent
- . \rightarrow penile Shortening.

3. Tunical Incision or partial Excision & autologous grafting.

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Minimal Excision or Simple release
Incision \rightarrow autologous grafting either from:

✓ Saphenous Vein

✓ Tunica Vaginalis

.... Dermis

• Buccal Mucosa

• Temporalis Fascia.

• Other lines of Ht -

① Radiotherapy

↓ Pain

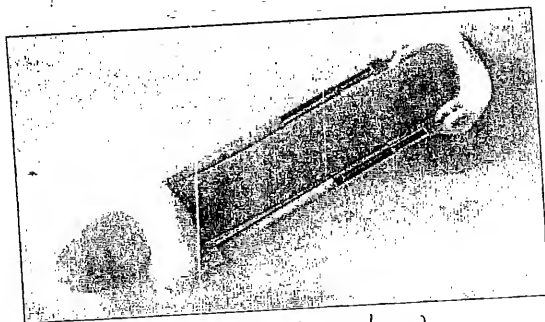
S.E \rightarrow fibrosis

should be avoided in young age.

② Iontophoresis : Verapamil 10mg + 4cc Saline \rightarrow

improve ! Pain & Curvature $< 45^\circ$.

③ Penile Traction Device : penile extender device
used For 2-8 hrs/d for 6ms \rightarrow ↓ Curvature,
Improve the length & girth



(Penile Extender)

Priapism

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① P. 64

Def. Persistent, AbNL erection that

lasts > 6 hrs
> 4 hrs

Not relieved
sexual excitat
or desire

not Relieved
by masturbat

Priapism > 6
Admised > 4

NB Prolonged Erection: Sustained penile erection
> 4 hrs → Some authors treat it if in < 4 hrs
or 1 hr.

Pathology of Priapism: (Affect only corp. cavernosa)

- > 6 hrs → ischemia & anidosis.
- > 12 hrs → destruction of sinusoidal endoth.
- > 24 hrs → Thrombosis
- > 48 hrs → complete Abrasion & Necrosis.

Types of Priapism:

Veno-occlusive (ischemic
or low Flow).

d.t: ↓↓ Venous outflow
(low Flow)

- More Common
- Painful.

Arterial (non ischemic,
High Flow).

d.t: ↑↑ arterial Inflow
(High Flow).

- less Common
- Painless.

Causes of Veno-occlusive priapism (all → ↓ outflow)

1. AbNL prolonged smooth ms. relaxat-
(Failed detumescence) of corpora cavernosa.
2. ↑ sp. viscosity.
3. outflow obstruct-
4. other causes

Veno-occlusive Prosthesis

S. 2

prolonged

① Abn. ↑ smooth muscle Relaxation (e.g. C. Cav.)

- ICI: incd. ↑ ↑
 - Neurogenic ED → exaggerated response to ICI
 - Papaverine alone (9.5%) > Bimix (4.5%)
 - > PGs alone (2.4%) > Trimix.
 - incd. is ↓ in: pts using home injections (alt. adjustm. to suitable dose).

α antagonist
Prazosin
Hydralazine
CCB
arterial VD

• pharmacologic Causes:

- ✓ Antihypertensives.
- ✓ Anti Coagulant → Heparin & Warfarin
- ✓ Antidepressants → Trazodone, Sertraline, Fluoxetine, Lithium
- ✓ Anti anxiety → Chlorazepate & Hydroxyzine
- ✓ Androgens → Replimant (in Hypogonadism)
- ✓ Adictives → Alcohol, Marijuana, Cocaine
- others:
 - Hormones → GnRH, Tamoxifen
 - Metoclopramide
 - meprobamate

• Neurologic disorders:

- CNS < Vascular dis.
- < Seizures
- < disc. (Lumbar).
- Spinal < Trauma

② ↑ Viscosity:

- Sickle cell anemia
- Thalassemia
- Thrombocytosis.
- Anti Coagulant withdrawal
- Hemodialysis

prostatitis } infection → ↑ viscosity (local)
Urethritis }

③ out-Flow Obst:

penile Metastases → Leuk.
Lymphoma
MM
UT Tm

pelvic → Edema
Hematoma

④ Other Causes:

- ✓ Idiopathic. ✓ common cause
- ✓ cavernosography (if undiluted material used).
- ✓ Amyloidosis
- ✓ CO poisoning
- ✓ Malaria

⑤ arterial Priapism (High Flow rate) → Mainly Traumatic

① penile or pelvic Trauma → Intra Cavernous arterial laceration

② After penile Revascularization

when inf. e.g. anastomosed to Corpora Cav. directly → high unregulated Flow to them.

NB on priapism

① ICI may lead to → venous priapism: d.t. failed adhesione Mkt
arterial " d.t. inf. to Cavernosus a. by needle.

② Priapism acc to age:

- children → Blood dis. or neoplasms
- Adults → ICI or Idiopathic

③ Stuttering Priapism: → Recurrent attack that is frequent → intermittent

- usually High flow
- at first painless → then painful

RISKY pt sickle cell
SCD
Past Hx of ich Flow priapism

Repeated Partial Priapism may be due to:

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- Sickle Cell dis
- Trauma
- Psychotropic agents

α -adrenergic stimulants as Ephedrine can improve & prevent severe priapism.

Diagnosis of priapism G. Hangerford & priapism

	Veno-occlusive Priapism	Arterial P.
<u>Incid.</u>	Common	less common
<u>onset</u>	Acute	gradual
<u>Pain</u>	+ve (ischemia)	-ve (no Ischemia)
<u>Rigidity</u>	marked	less
<u>Aspirated Blood</u>	venous like (dark red)	Arterial (Bright red)
<u>PPDV</u>	↓ PSV Peak syst. vel	↑ PSV
<u>Cavernosography</u>	↓ venous Flow	NL
<u>Prognosis</u>	PODR if ischemia	Good

Lab Invs.

CBC → Anemia, leukocytosis & Thrombocytosis

BG → To diff. bet 2 types of

Blood Gases

priapism & to detect toxicity

Penile duplex & Pelvic Angio.

detect fistula (in arterial type)

CXR if Hx of

Mq Metastases

(a)

(NB)

Blood Gases

Ischemic Type
 PH: < 7.25
 PO₂: < 30 mmHg
 CO₂: > 60

Non-Ischemic

PH: 7.4
 PO₂: > 40
 PCO₂: < 40

NL mixed venous sat.

↓

Flaccid penis

PH: 7.35
 PO₂: 40
 PCO₂: 50

Treatment

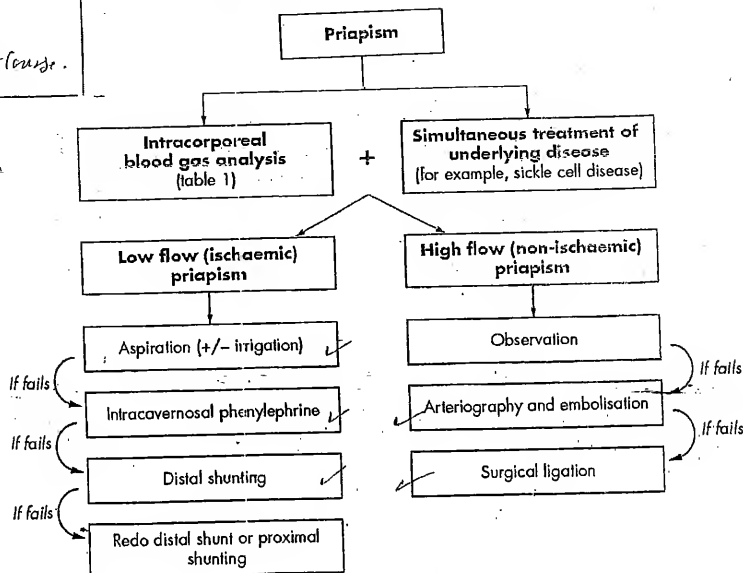
- (1) low flow priapism.
- (2) High flow "
- (3) Sustaining priapism.
- (4) SCD associated "

A Case of Priapism

Simple Measures

- Analgesics & anaesthetics for pain
- Exercise
- Ice back
- Masturbation
- Sexual intercourse.

- [- Patient History
- [- physical Exam.
- [- Corporal aspirate & Blood Gas assessment
- [- IIMU
- [- PDU



NB Low flow IH

1. 1st line: Aspiration +/- irrigation → relieve priapism in 35%
(علاج أولي) سحب الدم مع أو بدون الريجاسيون
2. 2nd line: IC Phenylephrine injected same amount of saline
Aspiration 70 ml of saline

phenylephrine [Sympathomimetic]

الابول ایل ← ۱۰۰ میکروگرام (ایم)
 ۱-۵ = ۱۰۰ میکروگرام ← نیف ۲۱ : (۱۰۰ میکروگرام) یکشنبه ۳۰-۱۰۰
 کل ۰-۱۰۰ : یکشنبه ۱۰۰-۱۰۰ [۰-۱۰۰ میکروگرام ایل او ایل]
 یکشنبه ۳۰-۱۰۰

Precautions

RISKY PT ← Cardiovascular dis.
 Extreme of Age.

Monitor : BP & pulse

S.E : Headache ✓ Tachycardia
 HTN ✓ reflex bradycardia
 dizziness ✓ Arrhythmia.

if failed to shut operation →

3. Stuttering Priapism

Hair ~ A. Antiandrogens ← -- products : Ketoconazole
 -- release : GnRH agonist
 -- RS : CyPA, Cyproterone acetate
 ↓
 Diene

B. Etileferine (α agonist ; 25-100 mg)

C. Baclofen :

GABA agonist inhibitory neurotransmitter
 40 mg / d.

D. PDE-I : ~~Phosphodiesterase~~

Viagra Sildenafil (25-50 mg / d) or Tadalafil (5-10 mg / d)

شرط انتقاله قبل جود
 Priapism.

E. Others :

Digoxin
 Ketoconazole + Prednisolone (J Uro , 2009)

4. Sickle cell dis. ass. Priapism

oxygenator
 Hydrate
 APKalmizole
 Analgesics (Morphine)
 Exchange Transf. :
 ↑ Hct > 30%
 Hbs < 30

Surgery of Priapism

Indications

- ① Failed Aspiration & ICI.
- ② Systemic Toxicity
- ③ Neglected cases > 36 hrs

Venocclusive priapism

Shunt of Blood From Corpus Cavernosa to:

- (1) Glans
- (2) C. Spongiosum
- (3) Saphenous Vein

① Cavernosoglanial shunt (Dorsal Shunt)

2 techniques available

Closed Method
(Winter Tech.)

Bopsy needle passed from glans to C. Cav. to induce Fistula bet glans & Corp. Spongiosum + through glans.

Open Tech.
(AL. Ghossein)

instead of needle
↓
Incision
Biopsy
done.

② Cavernosospungiosal shunt: (Proximal Shunt)

Fistula done by 2 Longit. incisions in Corp. Cav & adjacent parts of C. Spongiosum

J.E.I. urethral injury & ED.

Cavernosospungiosal Shunt:

done for severely neglected cases
Fibrosis after 24 hrs difficult op.
that need to treat ED →
Penile prosthesis
(Inflatable - not suitable due to Rigidity of Corp.)

II Arterial Priapism

ligation of Cavernosal a.

or

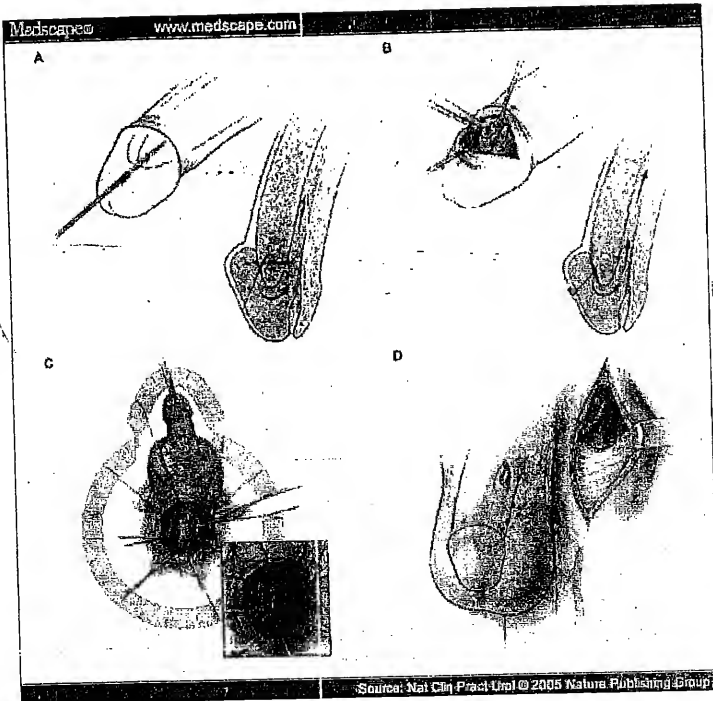
Embolization of penile artery

Venogenic Arterial

- ① Aspiration
- ② Sympathetic
- ③ Shunt op.

Ligation

Embolization



Surgical shunts for the treatment of priapism. Distal cavernoglanular (corporoglanular) shunting is represented as (A) Winter and (B) El-Ghorab shunt procedures. Proximal cavemospongiosal (corporospongiosal) shunting is represented as (C) Quackels/Sacher and (D) Grayhack shunt procedures. Images drawn by David Fini and reproduced with permission from © (2005) Johns Hopkins University.

Penile Fracture & Trauma

(Fractured penis & Penile rupture)

nbw)

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def. rupture of Tunica Albuginea of Corpora Cavernosa when the penis is in a fully Erect state.

Etiology: d.t. sudden Blunt trauma or Abrupt lateral bending of penis when it's Erect w/ Cause breaking of the markedly thinned & Strong Tunica → Fracture
↓ at (3, 9 o'clock)

Trauma may occur d.t.:

(30%) → 1. Most Common: during Sexual intercourse while in Female Superior position when penis Slips out of the vagina & strikes perineum or S.P


2. Rare Causes:

- ✓ Industrial Accidents
- ✓ Tough masturbation
- ✓ Gunshot wounds
- ✓ applying clothes when penis is Erect
- ✓ Mechanical Trauma → aggressive breaking of Erect penis.

- CIP
1. Sudden onset & Sound: Popping, Cracking ^{and snapping} & disturbance. (20)
 2. Pain: minimal - severe sharp pain acc. to degree & injury
 3. Hematuria: If there is urethral injury.
 4. urine retention: If urethral injury or Perinethra Hematoma causing BV obst.
 5. BY Examination: (Eggplant deformity):

groin and
 • Curved
 • deviated away from
 Site of tear & v
 To mass effect of
 Hematoma

pubic arch
 v 3 9
 c/s 6 (Rare)

Deformity

Swelling
 • localized clot
 over the site of
 rupture or felt
 as firm discrete
 mass over w
 the penile skin
 can be rolled
 [rolling sign]

Ecchymosis

If Buck's Fascia

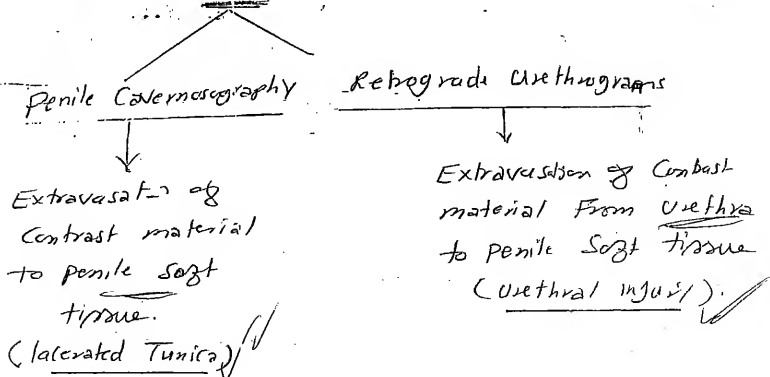
Intact
 ↓
 Ecchymosis
 confined to
shaft

Ruptured
 ↓
 Ecchymosis
 contained in
 Colles Fascia
 ↓
"butterfly pattern"
 Ecchymosis over
perineum, scrotum,
lower Abd. wall

Also → ± Tenderness.

Diagnosis:

- History
- Examination
- Inv $\left\{ \begin{array}{l} \text{lab: Microscopic Hematuria on Urine analysis.} \\ \text{Rad} \end{array} \right.$

Treatment

دکتر، مصلح

Surgical Reconstructive Surgery

- Management:
- Cold Compresses
 - pressure dressings
 - Anti-inflammatory medications.

Course & prognosis: with prompt & Expedient Surgical management \rightarrow Excellent outcome.

Complications \rightarrow ED?

- ED
- Pain
- Fibrosis
- Fistula

- Cavernosospinial shunt (Fistula) &
- ABNC Curvature
- Painful Erect
- Penile abscess
- urethra - cut fistula